Communication Design Quarterly

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Editorial
Of Form, Context, and Use

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Form and Function

Many of us have heard the expression “form follows function.” It’s a nice idea in theory: The notion the item we create inherently lends itself to a particular use. After all, the shape of a hammer should intrinsically tell us the tasks we can perform with that tool – be it pounding or pulling nails. But those of us who study human behavior related to use know this relationship of form to function is often far from the case. In truth, the connection between design and use is far more complex and often unpredictable.

In truth, it is context that generally drives what constitutes a functional form. That is, the context in which we use items often affects how we perceive them in terms of what tasks they can be used for and how well they can perform such activities in that setting. The hammer that might be useful in an open setting might be ineffective in an enclosed space where the user does not have the space to swing it with the force needed to pound in nails. As such, we communication designers need to continually reflect upon context any time we consider design in terms of use and usability.

Context, Use, and Design

Perhaps the first step in this process involves revising the language we use to discuss the relationship of form to function. Thus, the adage of “form follows function” needs to give way to “creation conforms to context.” By linking the idea of setting to that of design, we create a mindset that recognizes design can not be universal (i.e., we can’t create an item that will be equally usable in
all contexts). We also realize the central role an understanding of context of use must play in any design process.

Interestingly, technologies are not completely at the mercy of environments when it comes to design and use. After all, humans regularly employ technologies to change the context in which they are used. (We can, for example, use a hammer to create a space that is ideally formed for using that hammer as designed.) This symbiotic relationship between creation and contexts means we, as communication designers, will always face the challenge of understanding new settings in relation to user needs and expectations. Thus, our research needs to examine the environments in which we employ technologies in communication practices. The entries in this issue of Communication Design Quarterly represent a collective exploration of such factors.

**Overview of the Issue**

The issue begins with two editorial that explore how the contexts in which we communicate affect how we share information and ideas. The first entry, Katherine Hepworth’s “Big Data Visualization: Promises & Pitfalls” examines the ways in which we think about and the approaches we use to convey large amounts of data via visual displays. In a second editorial, Beth L. Hewett asks us to re-think our approach to literacy to include the technologies we use to craft communiques and access information. In so doing, these two pieces help us realize the contexts in which we communicate and the factors we need to consider when addressing issue of usability.

These editorials are followed by four articles that further explore how setting can affect use. Heidi Skurat Harris and Michael Greer, for example, ask us to re-consider how the learning management technologies instructors use to interact with students in online classes have implications for how instruction is delivered. Amanda M. Licastro, in turn, builds on these ideas by exploring how student perspectives of the technologies used in online education affect perceptions of and expectations associated with online education. In this way, the combined ideas presented by Skurat Harris and Greer and by Licastro provide a holistic perspective of users involved in communities created by online educational contexts.
This notion of community is further examined by Jennifer deWinter, Carly A. Kocurek, and Stephanie Vie who use a feminist approach to review the idea of labor (particularly social labor) as created within the context of gaming communities. Their entry helps readers better understand how perceptions of work guide activity in a community in ways that influence design in different settings. James Kiwanuka-Tondo and Keon Pettiway expand this examination of context to the international level by reviewing how different geopolitical, historical, and cultural factors affect risk communication in the Greater Horn of Africa. Their review focuses on how the application of SWOT principles (Strengths, Weaknesses, Opportunities, and Threats) can enhance our understanding of design in such context.

The issue then concludes with two book reviews on texts that explore contextual aspects affecting ideas of use and usability. In the first entry, Daniel L. Hocutt reviews Ehren Pflugfelder’s book *Communicating Mobility and Technology: A Material Rhetoric for Persuasive Transportation*. In so doing, Hocutt re-enforces how humans and technologies are interconnected in ways that allow each to influence the evolution of the other in terms of the contexts in which the two interact. Similarly, Ann Shivers-McNair’s review of *Risk Communication and Miscommunication: Case Studies in Science, Technology, Engineering, Government, and Community Organizations* by Carolyn Boiarsky reminds us of how contextual factors affect perceptions of and communication about risk in different environments. By summarizing these ideas, these two reviews expand upon the relationship between context, design, and use noted in the earlier editorials and articles in this issue.

**Concluding Thoughts**

Usability is a complex concept requiring designers to understand a range of variables when creating materials. As such, the contexts that affect use become central area of focus in researching usability and addressing user expectations based on experience. By reviewing these connections, the entries in this issue provide insights into a range of dynamics affecting use across different contexts. Readers should thus view these editorials, articles, and reviews as examples of the kinds of factors to consider when examining usability in different settings.
Editorial
Big Data Visualization: Promises & Pitfalls

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A few weeks ago, I was having dinner with a friend when a controversial subject came up. My friend had an extremely strong opinion about the harm caused by vaccination, and his argument went something like this: “I’ve seen the data. There was an infographic laying it all out.” He couldn’t remember specific numbers from the visualization he’d seen or the author of the article. He couldn’t even remember the name of the publication, but the data visualization’s overall argument was firmly lodged in his mind. His situation is not unique, and it provides telling insights on how we, as humans, perceive and respond to big data visualization.

SEEING IS BELIEVING BECAUSE SEEING IS SEDUCTION

People want to believe. From faith practices and fortune-tellers to science and data, the desire to believe in grand visions, and small facts that support those visions, is undeniably human. And we have a tendency to believe what we see more than what we hear, read, or feel. No matter how much evidence we have that seeing is not necessarily believing, the experience of seeing is strongly correlated with truth.

This human quality is as true of the most rigorous researchers, as it is of small children. Seeing things concretizes them in our mind’s eye. It makes them seem more permanent and more real. We’re all less skeptical of information presented in a visualization than information presented entirely as numbers and text. No matter how abstract, complex, or multifaceted we know a given research problem is, information distilled into a simplified visualization is
seductive. Among researchers there is little acknowledgement of or reflection upon the seductive quality of data visualization. This oversight has dangerous implications for research quality, and the human subjects represented through research data visualizations.

DATA VISUALIZATION DEFINED

Data visualization, in sum, is the reduction and spatial representation of datasets in such a way as to make them more intelligible than in their pre-visualization, tabular format. Data visualization includes broad categories of spatial representation such as maps, charts, tables, and infographics. In the realm of research tools, data visualization is uniquely persuasive. It’s a fundamentally political practice, one that constantly molds beliefs, behaviors, and emotions, predominantly at a subconscious level. Sociologist Nikolas Rose has called them “little machine[s] for producing conviction in others” (Rose, 2008, p. 36). This persuasive quality of data visualization, is sometimes portrayed as inherently bad. A recent National Geographic article described it as “weaponized data visualization” as if your next chart could be hiding a secret cache of weapons (McGhee, 2015).

This militaristic language is representative of our certainty that “show me, don’t tell me” must be true and the extreme suspicion with which subjectivity in data visualization is held. We rely on data visualization for so much: reporting on sensor networks, displaying critical data, facilitating communication, and helping us make good decisions, both in research and in our everyday lives. Consider, for a moment, life without Google Maps or GPS navigators. While geographic maps are a convenience that we would miss, data visualization also affects our democratic rights in fundamental ways. In the 2000 presidential race, for example, the poor visual organization of the butterfly ballot in Palm Beach County in Florida is said to have caused thousands of voters to vote for someone they did not intend to, costing Al Gore the Presidency (Wand et al., 2001). The thought that so many these valuable functions depend on a subjective, fallible medium is uncomfortable.

I’ll explain the persuasive power of visualization in order to demystify it. This power relates to the potency of immersive
communication as compared with literate communication. Literate communication is of course related to language, reason, and critical thinking. It encompasses all forms of communication that require fluency in written, spoken, or read language. While most communication requires some degree of literacy, certain forms of communication depend on it much more than others. Academic articles, long-form journalistic writing, and detailed instructional manuals are all forms of communication that depend primarily on literate communication. This concept of literacy is the one communication researchers thrive on, and feel most comfortable with.

**IMMERSIVE, EXPERIENTIAL COMMUNICATION**

Then there is immersive communication, the experiential quality. It’s related to aesthetics and emotion. All communication leaves us feeling a certain way, due to many small details that affect our emotional reception; this emotional response is the immersive component. When listening to someone, the cadence, tone, and volume of the words spoken all affect our emotional response to those words. When reading highly literacy-dependent communications such as academic articles, immersive aspects of the communication include the quality of the paper the text is written on, or the brightness of the screen, the font style, size, and weight, and the compositional layout of the article. Text that is published in a hard-to-read font, too-small font, or laid out with lines too close together tend to illicit negative responses irrespective of the content. Generally, the more visually or aurally dependent a communication is, the more it relies on immersive communication. Data visualizations, in-person debates, and video footage are all communication formats that rely heavily on immersive communication.

The potency of such immersive communication is connected to the seductive power of emotions and the ancient fight or flight responses in our brains. Strong emotions trigger what psychologist Daniel Goleman refers to as “emotional hijack” (2012) in which the reasoning parts of our brains are temporarily overridden by emotional responses, which come with overwhelming feelings of righteousness and certainty. The triggering of this physiological
response by immersive communication is the reason advertising is effective, the reason we have art, and the reason we love music. Immersive communication is uncomfortable to contemplate for most researchers. Some may even consider the phrase “immersive communication” a contradiction. But its existence is undeniable.

In the anecdote I relayed earlier, my friend had no recollection of the literate aspects of the data visualization he saw on the subject we were discussing. But he clung firmly to the visceral experience of the immersive communication it conveyed. Immersive communication in research is unavoidable simply because the immersive aspect of communication is unavoidable. No matter how clinical or remote a communicative exchange is, we’re left with an experience of it.

Most research processes and outputs focus on the literate aspects of communication, with little to no attention given to immersive aspects. For example, visual presentation of research findings in academic articles is most commonly kept to a minimum and used exclusively for illustrative purposes. It is possible to communicate complex research findings and arguments in visual formats such as maps, infographics, and charts. But primarily visual formats are not considered acceptable research outputs by most academic publications unless they are presented as supplements to an argument written out in standard academic language. This situation results in research findings being experienced as flat, and boring.

**WHY DATA VISUALIZATIONS ARE ENJOYABLE**

Data visualizations are so compelling because the medium demands equal footing between literate and immersive communication. Without significant attention given to immersive visual elements, such as color, symbols, and spatial relationships, data visualizations are unintelligible. Individual colors, color combinations, line thicknesses, patterns, icons, font styles, weights, and sizes all affect our emotional response to communication. Consider, for example, the differences between presenting statistical information about US states in a black and white table in an academic article, and that same information presented online in
a geographical map with statistical significance represented by color tints. The considered selection and spatial arrangement of these immersive elements contributes to data visualizations being inherently more pleasant than most research outputs, both to look at, and to work with. And so, we like them. It’s this liking that makes data visualizations inherently more persuasive. More productive of experiential, visceral responses that sway our beliefs in ways we’re either completely unaware of, or only vaguely realize.

Subjectivity and persuasion are inevitable in big data visualization. But persuasive doesn’t necessarily mean inaccurate or immoral. Immersive communication is inherently persuasive simply because it is emotionally, rather than rationally, parsed. Despite what common terms such as “visual language,” “visual grammar,” and “visual rhetoric” suggest, visual elements cannot be parsed in the same way as language. Visual presentation of information is far more complex, and far less rule-bound, than language.

In the mid-twentieth century, communication research was dominated by the idea that all communication, including visual communication, was as rule-bound as language. This idea was epitomized in semiotics, a theory that envisaged all communication as one-way transactions involving three elements: sender, message, and receiver. While a few researchers still hold this view, many others have repeatedly shown it to be false. Across many fields—anthropology, communication studies, graphic design, and sociology—the prevailing understanding is now that communication depends on interpretation and mediation. A vast array of individual, cultural, and environmental factors contribute to visual meaning in any given context. These include associations with particular visual elements stemming from cultural and subcultural, community-wide, societal, and national traits. There are also important institutional contexts.

**COLLABORATION IS KEY**

No one, no matter how expert in a particular visual discipline, can understand all uses of particular visual conventions. No amount of visual comprehension at one particular moment in time guarantees
continued comprehension. Visual meaning changes at the same pace, and as intricately, as human culture and physical environment do. For example, two visualization strategies in common usage today, fever charts and donut charts, were unknown only decades ago, while many other charts have fallen out of common usage.

The changing nature of visual meaning affects individual elements within visualizations too. The symbolism of color, for example, is different and at times opposite, from culture to culture and also changes over time within cultures. For example, red is regularly used in so-called “universal” signage worldwide — in airports, train stations, and many public buildings — to indicate danger. While this makes sense in a western context, where red has traditionally been identified with anger and danger it is not so intuitive from a Chinese perspective since red is more commonly associated in Chinese culture with good fortune and luck.

These varied and shifting meanings are part of the reason why data visualization is such a collaborative and interdisciplinary field. Collaboration allows multiple perspectives as well as multiple skill sets and disciplinary backgrounds. Data visualizations draw from the disciplines of graphic design (my area), interaction design, technical communication, data analytics, statistics, math, psychology, and computer science. Collaborations between artists, designers, historians, journalists, scientists, and technical communicators who draw from these disciplines make best practice big data visualizations.

Working with big data shifts the role of data visualization in research. It moves from an optional research output to a necessity for data exploration. With small datasets of say, hundreds or even thousands of data points, it is possible for many researchers to navigate the data in a numerical format to identify patterns or answers to research questions. In a big data context, where data points are at least in the millions, this kind of scanning of numerical data becomes a physiological impossibility. Instead, researchers must rely on visualizations to query and summarize data in order to answer research questions. The subjective, persuasive practice of data visualization becomes an essential part of the research process.
TWO DIRECTIONS FOR BIG DATA VISUALIZATION

Working with big data also changes the nature of visualization. Because big data sets are, by definition, harder to comprehend than small data, big data visualizations need to be better at making data comprehensible. Two trends in best practice in big data visualization, bear this out: interactivity, and real-time updating.

Trend 1: Interactivity

Interactive elements help researchers explore their data sets at various levels of complexity and in various spatial configurations. An increasing number of data analysis tools — NVivo and R, for example — contain interactive visualization modules that allow researchers to visualize a particular set of data points in many different spatial organizations. By hovering or clicking on data groupings and individual data points, the researcher is lead to other visualizations of his or her data, providing new perspectives that may not have been arrived at without this interactivity. Being able to switch between so many views quickly and easily allows researchers to explore their data in previously unimaginable ways.

Still other tools have been created — Graphiq, Immersion, and Tableau, for example — that use interactive visualizations as the primary form of data analysis. These tools hide the numerical complexity of data, instead presenting interactive visualizations as the sum of research findings. Each of the sometimes thousands of individual perspectives enabled by these interactive data visualizations temporarily reduces complexity, cutting through otherwise impenetrable fogs of data, and each providing a unique perspective (Salvo, 2012). This increase in data visualization interactivity has been made possible through a combination of advancements in interaction design, software usability, and Web 2.0 technologies.

Trend 2: Real-Time Updating

The second trend in big data visualization is real-time updating. These interactive visualizations incorporate new data added to datasets instantaneously, through API access to publicly available online databases. This technology allows visualizations to become
integrated with data generating systems, extending the value and therefore shelf-life of visualizations well past their development stage. These are the visualizations that become valuable exploratory research tools.

Interactivity and real-time updating transform visualization, which has traditionally been a two dimensional exercise using static graphics. These traditional, static graphs and maps are snapshots of data frozen in time. They can be very effective research findings; they can even be beautiful. But best practice big data visualization has moved beyond the static page to applications and websites that display live feeds of data continuously in four dimensions, the fourth dimension being time.

At their best, big data visualizations put data into a human context by relating scientific and statistical insights to environmental and social contexts. They highlight perspectives about our world, and our societies, that we can collectively benefit from. Most importantly, they build understanding between users and the people who interact with the data generating systems we study by fostering respect and empathy for people and situations of which we would otherwise be unaware.

**Example 1: Histography**

The “Histography” project by interactive designer Matan Stauber (see Figure 1), for example, visualizes the entire contents of Wikipedia as an interactive timeline. Shaped like a reflected histogram, it records every page on Wikipedia as a single dot.
Figure 1: Histography big data visualization site, organizing. Top image shows one event on rollover, bottom image shows extra information on click.

Videos and photos are pulled from Wikipedia, and converted into enticing visual rollover effects for each documented event. Histography encourages us to choose pages randomly, and we’re rewarded with surprising footage of people, experiments, and events from the past. Clicking on a rollover image brings up both more details from Wikipedia and the option to read the entire article within Histography. As new articles are added to Wikipedia, Histography automatically updates. Upon selecting a date range,
Histography highlights the events within that range that are mentioned in the greatest number of Wikipedia pages.

By presenting such a comprehensive timeline, Histography contextualizes important historical events and scientific discoveries in a way that easily counteracts revisionist histories based on religious beliefs and pseudo-science. It debunks myths at the same time as being entertaining, thoughtful, and fun. Histography also presents a completely original way to investigate historical events, one that gets around a significant challenge in historical investigation: avoiding confirmation bias, the unconscious tendency to look for information that confirms one’s preconceived ideas. Histography is by no means perfect. Given that Wikipedia, on which it’s based, is renowned for unreliable content, Histography can’t be used as an authoritative source. But it does show the potential of big data visualization to be accessible, enjoyable, beautiful, and in the public interest.

**Example 2: The Drone Papers**

At their worst, big data visualizations help a few corporations make vast profit off of human suffering. The big data of modern surveillance and warfare is also big business. This is the side of big data revealed in the Drone Papers, obtained by investigative news outlet *The Intercept*. The “Finish ops” represented on this map (see Figure 2) are operations to assassinate individuals using missiles. This is the big data of dehumanization.

![Figure 2: Images from the Drone Papers, US drone program documents obtained by *The Intercept*. This image shows drone strikes in Yemen.](image)
In another image from the Drone Papers (see Figure 3), a similar kind of dehumanization is created visually.

**Figure 3: Images from the Drone Papers, US drone program documents obtained by The Intercept.** This image shows deaths and injuries from drone-delivered missiles.

In this image, E.K.I.A. stands for “enemy killed in action.” This is the default government classification for everyone killed by United States-operated, drone-delivered missiles. The word “enemy” is used despite the US military’s own finding that only 10% of the people killed in this way are their intended targets. Civilians, bystanders, ordinary people going about their everyday activities, just like you and I, are listed as “enemies killed in action.” It bears repeating because it’s so unbelievable. These big data visualizations are shocking only in their banality. The language is ambiguous at best, and intentionally misleading at worst. The visualizations are crude and simplistic, obfuscating the big data underpinnings of the drone program. And I argue that they’re intentionally so, reducing such large scale loss of life, to administrative details.

Most big data visualization falls between these two extremes. Frequently for profit, but without causing harm. One growing trend, in big data visualizations falling between the extremes, is combining interactive technology with design and gaming principles to incorporate big data into interactive, entertaining narratives.
**Example 3: Interactive Wall, US Tennis Open 2013**

For example, design agency Hush made a fifteen-foot interactive wall for attendees of the US Tennis Open to enjoy. The interactive wall allowed tennis fans to test their knowledge of player statistics in gameplay that is something like Wii Fit meets Tinder. This beautiful, fun interface wove vast sums of tennis data, that would otherwise be overwhelming, into an inviting and enjoyable experience.

The interactive wall epitomizes the pleasurable potential, as well as the economic realities, of big data visualization. Created as an elaborate promotional tool for IBM and the US Open, the interactive wall was only enjoyed by those who could afford expensive tickets to the exclusive sporting event. This one example is representative of the elitism and profit motive currently driving corporate research into big data visualization (Schwartz, 2015).

**A CALL FOR EMPATHETIC BIG DATA VISUALIZATIONS**

While big data visualization has the potential to benefit large amounts of people and tackle global issues, current development and spending indicates this won’t be its main use. Instead, big data visualization is likely to continue to be developed for the use, and benefit, of relatively few, privileged communities. For better or worse, we are one of those communities.

In this piece, I’ve provided examples of a few different uses of big data visualizations. To keep the inevitable persuasion in big data visualizations within moral bounds, we must apply the same ethical rigor to our visualizations as we do to other aspects of our research. Renowned information designer Alberto Cairo has advocated for development of a field of “ethics of data visualization” (Cairo, 2014). He argues that the fundamental goal of data visualization should be to make people better informed. I would add to this that big data visualization should help people gain empathy for each other’s situations. Big data visualizations can only fulfill this aim when the teams working on them have large enough, and critical enough, understandings of the
persuasive, visual elements from which they are built. When we’re well informed, we can use the persuasive qualities of big data visualization to better inform others and to foster empathy.

We have a responsibility to educate ourselves about the literate and immersive aspects of various design elements within the communities where we want to share data. We owe this to ourselves, the agencies who fund our research, and the public. We also have a responsibility to gain enough understanding of the practical and ethical considerations of visualization in those communities, to wield the persuasive power of big data visualization for the common good. An important step on this path is acknowledging the persuasive nature of big data visualization and the inherent risks in its use. To understand, and take seriously, how visualizations affect both our conscious and unconscious judgments is to reduce the risk of misuse.

REFERENCES


Editorial

Reading, Writing, and Digital Composition: Reintegrating Constituent Literacies in Online Settings

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Communication design specialists have many challenges in the twenty-first century global, online world. Geographically distributed teams must work together efficiently and effectively. People may need to interact across cultures and languages or using a common language like English or Spanish. In order to complete coherent design projects, they often need to negotiate varied communications software. Most important, both to communicate within teams and to clients with widely varied communication skills of their own, engineers and other communication design professionals must be able to engage the basic literacies of reading, writing, and digital (i.e., multiple media like images, audio, or video)—often called *multimodal*—composition as a holistic skill set, and they must be able to use them well in online environments. These literacies comprise communication skills learned in school and honed in business settings; they are required for clear communicating whether through alphabetic texts or multimodal compositions.

**RE-THINKING LITERACY**

In many venues, scholars write about online writing instruction (OWI) and communication design. They are, in effect, writing about how writing is a core literacy, or knowledge and skill that is necessary to master in online settings. Although not as often discussed, the ability to read well in these same settings and to develop multimodal compositions using such media as text,
images, and video in online settings also are core knowledge areas and skills. Figure 1 illustrates the relationship among these three core literacies in a Venn diagram, where the overlapping circles represent the *new, integrated online literacy of contemporary communication design*. I argue that communication designers need to understand these three distinct literacies holistically, where the parts are equally inherent to their work. Of course, readers of this journal already use these three literacies in technical communications work, but perhaps not as deliberately or self-consciously as possible.

![Venn Diagram of an Integrated Online Literacy](image)

**Figure 1: Venn Diagram of an Integrated Online Literacy**

When communications are designed using online technologies and (as is often the case) primarily for online consumption, the literacies of reading, writing, and digital composition interact deeply and require conscious consideration in design. For example, work products are always composed with particular readers in mind, meaning that writers will need a good command of vocabulary and writing styles particular to the audience’s reading comprehension levels. Further, communication designers need to be able to write in and for online settings, which means choosing when to use pure alphabetic text and when to add or lead with digital media like voice recordings, video, animation, or simple images. Within this context, the goal of this essay is to argue that communication design students and professionals should learn about the important interconnections among reading, writing, and digital composition
particularly for online settings in which the work is done or in which clients will use that work.

EARLY COMMUNICATIONS DESIGN

Long before computer technologies provided a plethora of ways to enhance communication design, reading and writing were visually enhanced with illustrations for a print-based world. In Europe’s Middle Ages, for example, monasteries became the office where communications intended for an elite, literate society were created (Sorabellla, 2013). During this time, particular monks performed their daily labor by candlelight in their cells or a designated scriptorium, where they copied out spiritual and classical texts, preserving them and making them available more widely. These texts filled libraries in monasteries, wealthy homes, and burgeoning universities.

The monks conducted such laborious, exacting, and vision-stealing work because they understood the need to make texts more widely available to an increasingly literate public. Just as important, they understood that reading is made both more pleasurable and comprehensible when it is designed and delivered with images. Therefore, certain talented monks illustrated, or illuminated, the texts with visually augmented alphabetical features and gold-enhanced pictures intended to beautify and clarify them. Illustration thus enriched such texts’ already great intrinsic and monetarily extrinsic value. The artworks that accompanied these old texts are reminders that communication design is an ancient art marrying reading, writing, and design—to which twenty-first century designers and writers merely are applying new technologies.

SEGMENTED LITERACIES

Reading, writing, and design are integral to a whole literacy that enables communication among people who are located in different physical places (i.e., not physically co-located such they need to interact using the phone, Internet, or other technology). Despite their natural union in ancient and newer texts, however, the arts or skills of reading, writing, and design have been severed from one
another in academic settings. This segmentation has ancient roots in the Greek education system that separated grammar, logic, rhetoric, and the arts—an educational practice that is perpetuated in schools today.

The great philosopher and teacher Aristotle demonstrated in his books that humans think categorically—that people see the whole and then naturally separate and categorize into parts. According to Atwill (1996), Aristotle’s taxonomy of knowledge segmented the domains of epistemology, or how one knows, by describing the nature of things by virtue of their purposes. For example, Aristotle distinguished the qualities and goals among such studies as metaphysics, physics, ethics, and rhetoric (Atwill, 1996). For a more contemporary example, in school, teachers break down the study of a subject to make concepts more comprehensible by naming and studying them as constituent parts of a whole (e.g., studying anatomy via the naming of the body’s systems and organs). Similarly, communication designers often segment work product by clients’ practical needs, communication types, delivery strategies, or the varied messages it must convey.

This approach has its virtues. There is symmetry and beauty to viewing the pieces of which a species, substance, or behavior is comprised. In school settings, breaking down the whole into categories can do much to help teachers and scholars understand the characteristics, processes, and products of a field of study. Rhetoric, one such field of study, is often defined as the art of persuasion (Atwill, 1996) or skillful and effective uses of language. As such, rhetoric has been parsed into many subfields, which is useful because categories enable deeper theorizing and more specific statements and descriptions of practice. In turn, these statements and descriptions help in teaching students how to use language well. Categories such as audience needs, document purpose, content development, organization, style, textual and visual design, and product delivery are especially helpful to teaching rhetorical written communication to students, as well as to putting text-based writing and multimodal design to daily use in workplace and everyday settings.
ONLINE WRITING INSTRUCTION (OWI)

Thus, it is with the various subdisciplines of the so-called field of writing studies as taught in contemporary colleges. Such subdisciplines include:

- Technical/professional communication and/or writing
- Business communication
- Basic writing
- First-year composition
- Argumentation
- Literary production
- Creative fiction and nonfiction

However, in recent years, these subdisciplines have been divided further where online education and composing settings have been concerned.

For example, now that writing is taught and practiced in online environments, rhetoric scholars research OWI to consider whether there are new theories and practices relative to writing online. They want to know whether placing an activity in different setting changes how it is done as well as how the composed product is received by its audiences. Just as the process of illuminating scripture one book at a time is different from using a printing press for mass production, writing accomplished primarily using word processing is different from using pen, pencil, or typewriters. To teach contemporary writing skills, educators need to know how the actual act of composing is different as well as how reading and receiving the product differs for the audiences. Further, given that writing is taught using computers at a distance for fully online students, it is crucial to understand how it should be taught differently in that setting.

Yet, these concerns are not for academics alone. In practical ways, communication designers also face these questions as they deploy new technologies for their work and as they hire and train novice designers. Knowing what higher education values and how postsecondary educators prepare new communication designers in
their technical communications and engineering courses ultimately is important to those who hire and train them. New to practices in the past 30 or more years, both composing in online settings and delivering work products online have changed what educators know of rhetoric and all its subspecies.

**REPERCUSSIONS OF CATEGORIZING LITERACIES**

I have specialized in the parsing of OWI, removing it from its constituent literacies (i.e., reading and digital composition) to focus on how teachers and tutors instruct writing in online settings and how students learn from them. Colleagues and I have begun to find common principles for how to teach writing and communication design in online settings as described in *A Position Statement of Principles and Example Effective Practices for Online Writing Instruction* (OWI Committee, 2013; see www.ncte.org/cccc/resources/positions/owiprinciples). We have, for example, theorized that teachers and tutors must develop new and/or different strategies to help students navigate both learning about composition when the teaching occurs in online educational settings and learning to compose online. Certainly, these are two separate yet intimately connected concerns involving

- The teaching of composition using digital technologies and
- The learning and practicing of strategies for using digital technologies to compose and deliver meaningful content.

Add to these the critical importance of being able to use reading, writing, and digital composition to communicate needs and desires with clients using distance-based technologies (e.g., phone or Internet).

My colleagues and I also have advocated strenuously for making educational settings and the composing instruction fully accessible to all participants. This idea might seem to be a nonissue in the communication design workplace, where accessible software and work product are (or should be) the norm per the Americans with Disabilities Act (ADA, 1990). However, addressing students’ different learning styles and needs by teaching them through audio, video, and still images in addition to traditional text is only
now gaining traction in higher education. Teaching about access in overt ways will lead to new professionals in communication design having self-consciously developed understanding of the company’s and clients’ access needs.

To a degree, I am partially responsible for a perception that OWI is different from more traditionally based communication design and writing instruction in brick-and-mortar settings. My work has focused on theorizing the various ways that teaching composition in online settings differs from doing so in onsite, traditional environments (Hewett, 2001, 2002, 2013, 2015a, 2015b; Hewett & Ehmann, 2004). This separation of OWI from its constituent literacies has helpful uses for developing theory and appropriate educational practices. For example, categorization facilitates examining the writing to see how it changes when students revise from text-based feedback delivered online versus in a face-to-face setting where students and instructors primarily talk about the writing.

Such study also has implications for communication designers because the global distribution of work via computer technology means that work product feedback usually is delivered in similar ways. Furthermore, those who are receiving team-based feedback to design drafts may understand or respond to that feedback differently when it is provided in-person versus through computer technologies. What academic scholars learn about how people revise when feedback is delivered through different technologies can help communication design supervisors with understanding workplace revision and the potential reasons for poorly or insufficiently revised products, missed deadlines, and inefficient processes. Nonetheless, separating the three core literacies of reading, writing, and digital composition into individual areas of study also has facilitated a simplified or even false perception of online writing as an individual, disconnected literacy from the needs of reading (online and off) and design (digital and otherwise).
REINTEGRATING LITERACIES

Fortunately, scholars and teachers in communication design and technical/professional communication are beginning to emphasize the need for reconnecting or reintegrating that which has been separated. For example, separately both Blair (2015) and DeVoss (2015) advocated for teaching multimodal composition—writing that includes the development of websites, videos, slideshows, and the like—into writing courses. Such digital composition is important because students not only encounter them in their ubiquitous uses of social media but likely will be using them for professional communications and creating such compositions in their future workplaces. This curriculum of skills is needed at every level where students learn to write in online settings.

To this end, Carillo (2015) argued for the need to reconnect reading literacy to writing because it largely has been neglected by writing educators for many years. Horning (2012) also addressed the complications of reading and digitizing for educators who work with contemporary students. Hewett (2015a) wrote that while students generally may struggle with certain kinds of reading, those who learn in online writing courses may struggle more. Thus, she outlined eight core comprehension themes that college students especially benefit from practicing in online learning environments.

Keller (2016) addressed the challenges students face in using the many literacies available to them, leading many to skim the surface both of content knowledge and composing skills. He argued that reading, writing, and digital composition all have a place in today’s college communication and composition courses. Cook (2007) indicated nearly a decade ago how important immersing online instructors into the online setting is, which Hewett and Ehmann (2004) also advocated. Such immersion likely will strike communication designers as appropriate given their newest employees’ needs to be immersed in effective professional—not just socially oriented—online communications. Finally, even in less academic venues as listservs (Nelms, 2016) and blogs (Warnock, 2016), scholars and teachers are arguing for creatively reintegrating reading, writing, and digital composition in online educational settings.
Such vital focus on these core technologies is coming at just the right time. Technologically enhanced—hybrid, to a large degree—classrooms are found in nearly all college courses, appropriately so as the college classroom needs to catch up with the twenty-first century workplace. Hybrid teaching and learning, which involve both face-to-face and fully online interactions, change the dynamic of any communication. How and when people share documents, talk together about their writing and work, and otherwise interact change in such settings (Snart & Paull, 2016).

At a minimum, the use of a learning management system (LMS) is common to even traditional, face-to-face classes. Hybrid online courses are becoming more popular, and tens of thousands of students enroll in them and in fully online composition courses each semester (Hewett & Warnock, 2015). To some degree, fully online courses replicate the global communication processes of geographically distributed work settings where communication design and other technical communications exist today. Special types of interaction planning such as using process scripts to manage collaborative team writing (Robidoux, 2010) become necessary in these settings. For communication designers, all of these factors mean they should begin to expect stronger literacy-focused connections between what novice designers learn in college and what they need in online workplace settings.

Those who teach and study OWI must reconnect writing to reading and design in these online environments. Students cannot, for example, write without reading their texts and instructions online. In asynchronous (i.e., time delayed) online courses especially, students find most of their learning is self-taught through what they read (Hewett, 2015a). Think about that amazing fact:

Online students only learn about composing through what teachers or instructional designers write and develop alphabetically and digitally with images and video or audio files.

To teach asynchronously, then, educators must focus on these three literacies in careful, imaginative, and reader-friendly ways or students will not succeed.
Make no mistake: Students must be able both to read and interpret the various media through which they are taught, and they must learn to produce it as well or they will not succeed outside of school (DePew, 2015; Hewett, 2015a; Selber, 2004). To this end, Selber (2004) argued strenuously that students must be functionally fluent with the technologies they will use, and DePew (2015) maintained that they must understand the ethics and rhetoricity of choosing and using those same technologies. The twenty-first century demands such connections among literacies because their interconnections in all places outside of school require attention. Otherwise, students are receiving substandard literacy education. Educators of all disciplines cannot afford to pretend that writing instruction exists outside of a more holistic literacy that includes reading and digital composition.

THE GLOBAL SOCIETY OF ONLINE LITERACY EDUCATORS

A new organization has been developed to address the needs of this new online literacy. The Global Society of Online Literacy Educators (GSOLE) was formed by interested scholars and ratified by its members in April 2016. Its mission with respect to OWI is to connect the professional expertise of all educators interested in the intersections among teaching reading, writing, and digital literacies in online educational settings. The organization’s international focus is intended to unite educators globally as they struggle to understand crucial literacy interconnections that occur in individual countries and between and among nations. To do so, GSOLE is accepting members from education and business who specialize in the work of communicating through reading, writing, and digital composition.

GSOLE is seeking those who also recognize a need to reinvent these literacies as the monks once did in their poorly lit scriptoriums. As stated on the homepage of the organization:

We are an international organization of teachers, tutors, and researchers dedicated to diversity, inclusivity, and access in literacy-based online education. We share an understanding that the key component linking all of online education is
literacy. Although online education tends to remove the immediacy and intimacy of face-to-face instruction, we suggest that successful teaching and learning in online settings are more deeply connected to literacy-based concerns than to physical presence or lack thereof. Three of the core literacies of the 21st century are reading, writing, and digital composition. However, these literacies largely have been studied and taught separately, and the resulting discussions about them have occurred in discrete sub-disciplines where their connections have not been fully explored or acknowledged. (GSOLE, 2016)

Thus, the organization invites new scholarship and thinking about how readers take in information, how writers compose text, and how the many forms of digitally developed compositions influence both those who produce and those who consume such information. This organization is connected to communication design in a number of ways. For example, targeted research can help communication designers understand better when an audience might be more receptive to alphabetic text, still images, or video in the work products they develop. Additionally, collaboration between workplace communication designers and their counterparts in education can help shape that online literacy research as well as distill useable action tasks from it.

GSOLE presents opportunities for participation in educational webinars, a research fellowship and mentoring program, an online literacy teacher and tutor certification program, an Online Literacy Open Resource (OLOR) with practical strategies for online literacy in action, and an online journal, Research in Online Literacy Education (ROLE), with its first issue due out in January 2018. All of these resources can benefit communication designers in that they will use research and practice to demonstrate online literacy principles key to working with students, novice technical communicators, and clients in both online communications and design strategies. Moreover, they create places for communication designers to share ideas and perspectives (as well as best practices) on such topics as writing for online spaces versus print and assisting clients with making digital compositions choices that are reader friendly.
In terms of Communication Design Quarterly in particular, I urge readers to check out GSOLE (see www.glosole.org) and see where and how their interests and skills correspond with this organization’s goals. GSOLE needs the insight and knowledge of those who specialize in digital communications and technical writing particularly. Join college educators by teaching them what business trainers know; vice versa, learn from these educators what might help communication design teams and novice employees regarding literacy in online settings. For example, contribute a practical strategy to the OLOR, write for the ROLE journal, or speak in a webinar. Questions that readers might address include:

- How do communication designers and engineers use written (alphabetic) text in combination with images and video, for example, to complete work products?
- What do experts in this profession know about different audiences with different levels of reading skills that will inform the work teachers do in online education at the college level? How do they adjust or adapt materials, work products, and presentations to reach such varied audiences?
- What do novice or inexperienced employees need to know literacy-wise about distance-based communication? Are these lacking areas part of a natural learning curve for online business/communication design? Should they be taught as part of holistic literacy in college and, if so, how?

Communication designers can play a key role in helping GSOLE answer these questions by joining the organization, volunteering for the editorial boards and other positions, proposing their own OLOR and ROLE publications, and working collaboratively with online literacy scholars to make changes in nationwide education strategies. GSOLE would especially benefit from communication designers and technical writers who attend webinars and comment actively on what they know—research and scholarship need practical applications in the online communication design workplace.
CONCLUSION

Outside of GSOLE, I hope that readers will feel gratified that their unique sets of communication design skills and abilities are being recognized for what they are—integral constituent parts of a whole literacy crucial to twenty-first century education and workplace communication. Online composition demands a more holistic and, therefore, eclectic literacy approach. Together, we can reintegrate these three core online literacies to benefit ourselves, our students, and our global civilization.

The work of communication design engineers ultimately is the work of postsecondary education. Educators need to prepare students for many potential work places, all of which make use of online reading, writing, and digital composition. Whether communicating with one another through asynchronous text or deciding what clients need for their online work products, online literacy education is crucial for students who want to be communication designers or technical writers of any kind. Reintegrating reading, writing, and digital composition—particularly in online settings—into one holistic skill set will teach students about the kinds of communication for which they will be responsible in their future work. In turn, this reintegration can help new workers in such fields as communication design to compose and communicate more straightforwardly, efficiently, and effectively.

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Managing Community Managers: Social Labor, Feminized Skills, and Professionalization

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ABSTRACT
In the game industry, community managers engage in social and emotional labor as they split their loyalties between game communities and game companies. Community managers do not fully represent the interests of one group, and their intermediary role puts particular stresses on the types of emotional labor that they are called upon to enact. Further, community managers must also participate in social labor—work that builds and exploits social connections for monetary gain. Most of this labor, however, is undervalued and in some instances is simply uncompensated “free” labor carried out by members of a fan community. Ultimately, we argue, casting the role of the community manager as a social and emotional laborer feminizes this work, monetarily devaluing it while isolating workers in these roles from the communities that they ostensibly serve.

Categories and Subject Descriptors
H.0 Information Systems: General

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video games, community managers, social labor, emotional labor, feminized work, game industry

INTRODUCTION
Much effort has been made to understand the alienation of labor, particularly manual labor, from the production of goods (Marx, 1844/1959; Braverman, 1998). Workers in factories like those run by the now-infamous Foxconn, a Taiwanese company that saw a slew of suicides in 2010, are clearly removed from the means of production; workers have relatively little stake in the goods and wealth produced and are themselves often sacrificed in ways both direct and indirect (see, for example, Johnson, 2007).

In these contexts, those individuals sacrificed are frequently women performing low-skill and low-wage labor (Huntemann, 2013). Further, the sometimes fraught identification and analysis of a creative class of tech whizzes and nebulous “creatives” has led to increased attention to the work produced in many other arenas of the game industry (Florida, 2014). As Johnson-Eilola (1996) has articulated, the post-industrial age has seen us move from the production of concrete goods to the production of immaterial products—information itself. Similarly, Michael Hughes (2002) has argued that technical communicators’ value lies in their ability to transfer information from “those who have it” to “those who need it” (p. 275).

While labor practices are always evolving, the abstraction of human labor through the wage system is longstanding and fundamental. Efforts to theorize the implications of that extraction have helped shape our understanding of these processes and their effects (McCann, 2007; Zimmerman, 2008; Long, 2009). Within the game industry, types of labor are unevenly recognized, compensated, and valued. The workers assembling Xboxes and iPhones are often subject to terrible working conditions marked by long hours, low pay, and isolation. But even separate from the often-obvious exploitation of factory workers, the games industry uses labor practices that are not so much archaic as they are nightmarishly futuristic. The industry as a whole suffers from a high rate of burnout, and in fact most in the game industry appear to leave before 40 years old (in a recent International Game Developers Association (IGDA) survey, only 17% of the respondents were over 40, and the average number of years of work in the industry was a low eight years). In game
production, for example, crunch time subjects workers to extreme stress marked at least in part by sleep deprivation, isolation, and poor health.

Yet production is just part of providing consumers with the game experiences that they seek, experiences that include supplemental gaming materials, robust online communities, and the promise of long-term investment on the part of the company to provide future experiences and successful franchises. Within the context of these expanded experiences arises the fan—an avid consumer and effective agent of marketing. However, frustrations within fan communities can quickly escalate into large forces that act against the companies that provide their content (see, for example, Jenkins, 2007; Potts, 2014). Thus, as games companies have increasingly worked to cultivate fan communities, the industry has seen the rise of the professional community manager who works at the intersection of company strategy and fandom, translating the needs and desires of each to the other. This position requires that people know a brand (an activity requiring intellectual labor) and mediate communication through computerized systems (requiring technical labor). Possibly even more importantly, the community manager participates in the emotional and social labor of building and maintaining communities as they work within the liminal space between fan and company shill. As Potts (2014) has explored, community engagement in fan culture requires “a considerable investment in intellectual and emotional effort on the part of the fans and fan scholars.” It is this last form of labor—the emotional and social labor—that we interrogate in this article, but with a focus on the professional labor of community managers.

In this entry, we work to build a framework for understanding the social labor of community managers. We argue that community management relies on emotional and social abilities (i.e., so-called “soft skills”) and that these are a type of feminized labor. This characterization is particularly worth noting as the industry continues to suffer from profound gender disparity. This disparity is seen in terms of employment, as men make up 76% of the workforce (IGDA). It is also seen in compensation: for instance, the Gamasutra Salary Survey (2014) indicated that women earn $8,425–$31,000 less than their male counterparts.* The labor of community managers exists within the confines of traditional work structures, but additionally, community managers are often recruited from fan communities and bring their communities with them when hired into a company, raising questions concerning uncompensated labor.

Emotional and social labor is our primary focus in this article, and as such, we ultimately argue that a better understanding of both the required skills and eventual toll of this kind of work is necessary for its more appropriate valuation. That is to say, we argue that policies and fair valuation must attend to the ethics and basic needs of people who participate in the social and emotional labor of online community management. We ground this argument in interviews with practicing community managers and in textual analysis of materials, including job advertisements and industry reports. This mixed methods approach has allowed us to capture the perspective of community managers themselves, who shared with us information about the emotional and social labor with which they engage, while also tending to the way that the industry articulates and understands community managers’ roles and responsibilities. Interviews were solicited via social media and completed by email; other materials were located through corporate websites, industry publications, and sites that aggregate job listings.

COMMUNITY MANAGERS: FROM THE COMMUNITY AND FOR THE COMMUNITY

Community managers emerged from the business world in an attempt to build and maintain brand loyalty by cultivating a dedicated community through social media, live social events, and strategic communication with consumers. In discussing the evolution of the community manager, Michlmayr (2009) wrote, “The benefits of communities and the need to facilitate and manage them have given rise to the community manager position. … [The community manager] ensures that there is a healthy community around the project, interacts with users, developers and other stakeholders, and facilitates organizational aspects of the project” (p. 23). This aspect indicates community managers are agents of the business world; however, as Bacon (2012) has explained, “community managers may well need to step outside the traditional boundaries of the business world. For a community manager to really build a rapport with the community, he needs to fundamentally be a member of that community and exhibit the culture of that community” (p. 471). And in her Forbes article, Jennifer Grayeb (2012) defined the four pillars of community management as growth, engagement, listening, and improvement. The growth of the community is the growth of the brand, which is dependent on a sustainable, engaged community.

In computer games and particularly in Massive Multiplayer Online Game (MMO) communities, community managers have a prominent role because the number of members makes the environment potentially too large and alienating. In writing on online community sustainability, Humphreys (2005) noted

[T]he creation of subscription based virtual game worlds has generated the creation of communities. How are these communities to be managed? Do game participants hold all the rights of an ordinary offline citizen—the right to the same protections and freedoms? Is a publisher under any obligation to treat the game world community fairly?

World of Warcraft, for example, is often cited as a community-building game, which accounts for the financial success and longevity of the game. This factor is evidenced in numerous places: Brignall and Van Valey (2007), for example, argued, “Online communities offer individuals the ability to locate (at least in a virtual sense) and interact with other players who share a common identity or interests. WOW was explicitly designed to foster such socializing within the game” (p. 2). Indeed, it is this virtual socialization that has attracted attention from social scientists and literacy experts (see, for example, Nardi, 2010; Bainbridge, 2012; Gee, 2003; Squire, 2008).

Furthermore, as Gibbs et al. (2013) have discussed, the rich lives that people sustain in these games have given rise to in-game weddings and funerals, which mirror out-of-game events. Not only are people actively participating in their virtual communities, they are generating a tremendous number of written artifacts and participating in a great deal of intellectual labor. For example, the World of Warcraft wiki, or WoWWiki, is the second largest in the world (Wikipedia is the first), with over 80,000 articles and 5 million people accessing it monthly (McGonigal, 2011). These varied creations of community and literacy practices have outpaced the original expectations or even control of the original game creators. Yet the IP holders are loath to quash this type of
community building and community practice because the vitality of the online space requires that these types of social interactions and knowledge creation keep occurring.

The work of a community manager is often invisible to the community this individual serves. According to the “Community Manager” page on the WoWWiki, “A Community Manager is a Blizzard Entertainment employee that monitors the World of Warcraft forums, acting as a liaison between the players and the developers, along with other community-related responsibilities.” In response to this fairly simple definition, community manager Eyonix writes on this page that his job entails disseminating information and providing feedback to the development team. “This feedback,” he explained, “is gathered from numerous locations, which include but are certainly not limited to these forums, in-game chat, fan sites, guild sites, and third-party discussion forums.” Further, he wrote, “Beyond all of this, as a Community Manager I’m also here to moderate discussions, provide personal insight, offer humor, spotlight community related items, and silently absorb much of what our players are expressing and feeling.”

Thus, while Eyonix and other community managers participate and guide players, edit work written in public forums, and teach new players how to play, a vast majority of their work around players is simply listening and reading. Based on the garnered information, they are able to go back to developers, who can use this information to refine the in-game experience.

While this seems to be the norm for how community managers understand and represent their jobs, a survey of job ads uncovers a certain tension between communities, management, and marketing. In a recent job advertisement for an Xbox Live community manager, the first item under “Key Responsibilities” reads

Oversee global campaign strategy, creative development and production/execution and cross-campaign integration for Xbox 360 and Xbox Live—in partnership with global product marketing, digital marcom, consumer insights, regional teams and external agencies and partners. The vast majority of these campaigns are digital in nature (eg no TV advertising), so it’s essential that the person in this role has a strong digital marketing background—with an emphasis on social and community. (“Xbox Live & 360 Comms Mgr”)

A recent advertisement for a community manager for Warner Bros. specifies the individual will “Be the Voice of Warner Bros. to the Players” and “Be the Voice of the Community to the Game Team” (Warner Bros., 2015). The community manager thus becomes a disembodied voice, responsible for speaking both toward corporate objectives and in support of community desires. And in a posting for a North American gaming community manager, one of the key responsibilities is "own and/or support guerilla marketing activation at gaming tradeshows, events and LANs” (“NVIDIA”). Companies are trying to understand the role of community managers in terms of traditional marketing positions, and they see the community manager as an early career marketer who is social-media savvy. Yet community managers will not be successful if they simply begin by “screaming ‘one-way’ marketing messages at the rest of the community” (“3 Tips”). This is not community management, and while there might be short-term sales, there is no long-term pay off. If, indeed, community managers are employed for marketing, it should be a form of what Godin (1999) called “permission marketing,” a form of marketing that only occurs when a community trusts a person, and the person asks for the privilege of selling something.

FEMINIZED SKILLS: EMOTIONAL AND SOCIAL LABOR

Method

To learn more about the emotional and social labor required for effective community manager work, we interviewed nine current or past community managers who had worked with gaming communities and asked them the following questions:

- How did you get your first community management job, and how have you professionalized and been trained over the years?
- What are some of the best parts of working as a community manager? What are some of the worst parts?
- How could community manager jobs be improved?
- What are the most important skills needed to do this kind of work? How did you cultivate those skills?
- What do you think makes someone a successful community manager? Are those qualities or skills adequately recognized and compensated?
- What advice might you give someone looking to become a community manager?

These questions provided the foundation for us to explore the affective dimensions surrounding community management work as well as assess the kinds of skills required and cultivated by this job.

After compiling the survey results, the responses were coded using grounded theory (Charmaz, 2006; Creswell, 2006; Strauss & Corbin, 1990). As a theoretical approach, grounded theory allows researchers to examine qualitative data such as surveys and interviews and determine coding categories as they emerge from the data themselves. That is, researchers “withhold applying theoretical constructs to data until phenomena emerging from the data suggest either new theories or new applications of existing theories” (Wolff, 2015). Within the context of our own study, we applied grounded theory as a theoretical framework by examining the survey data for patterns as well as for unique but meaningful responses. Common codes that emerged upon examination of the data included empathy, listening, boundary setting, passion, training, and gender, among others. (These codes are explored more fully in the results section that follows.)

Upon seeing the repeated discussions of gender, empathy, and listening that emerged from the data—the latter two codes being, as we described earlier, typically feminized—we then applied as a secondary theoretical construct (as espoused by Wolff, 2015) feminist and Marxist theories. As Strauss and Corbin (1990) noted of grounded theory, “One does not begin with a theory, then prove it. Rather, one begins with an area of study and what is relevant to that area is allowed to emerge” (p. 23). As researchers, we began with an area of interest (i.e., the professionalization paths of community managers) and were intrigued to see gender emerge so clearly as a pattern in our data. What emerged, then, is the focus of this article: the roles that gender and stereotypically gendered behaviors play in the professionalization (e.g., hiring, training, advancement) of community managers in the game development community—a community where gender has long played a role. Classic grounded theory works toward finding a core or central concept that illustrates what the study is about (Saldana, 2011) and
in this study, we found gender (as seen in emotional labor) to be our core concept.

Results

Community manager job advertisements say that community managers must listen to their community members. This seems to be a consistent skill across job advertisements, interviews with practicing community managers, and advice columns for aspiring community managers. However, the community managers we spoke to said that it was not simply important to listen but also to empathize, a move that is far more emotionally taxing. As well, even though the concept of listening may read as somewhat neutral as compared to empathizing, both terms are frequently read as feminized. This work is feminized even though it is increasingly carried out by men. As well, the tension between empathy and feminized. This work is feminized even though it is increasingly carried out by men. As well, the tension between empathy and intimacy makes community management work difficult as managers must constantly find balance between becoming close to the community members they serve while at the same time maintaining their professional composure and their loyalties to the company with whom they are employed (Fournier, Sele, & Schoegel, 2005).

For example, one of the community managers we interviewed noted that empathy was crucial in his work (indeed, many of the community managers echoed the need for empathy). As he said, “Empathy is invaluable. If you can’t understand why people aren’t upset or happy or jealous or bored or whatever, you can’t do the job. Right up there with that is the ability to concisely, clearly and (again) empathically communicate about your brand or product. Sometimes that also means you have to be very creative (but that varies of course).”

I don’t think you can teach empathy—you either have that trait or you don’t. You can cultivate it by listening to and communicating with people from all over your community and indeed, the world.

Lisa, another community manager, similarly noted that “if you’re not passionate about supporting your community and you don’t love the game, you are less effective. … Project Management is key. SUPER key. So is setting boundaries, within your company and with your players.” This theme of boundary setting, of becoming close to the community and showing one’s passion, emerged over and over in the community managers’ interview responses.

Thus effective community managers embed themselves into the community and are active facilitators that enable a community to feel that they are part of something open and dynamic (see Brito, 2010; McGee, 2011). Yet an active and professional member of a community is difficult to identify without proof that this person is able to participate in a community, to be one of the community, while being professional enough in their interactions not to alienate people who look to join the community. Hiring companies often prioritize community members in the hiring of community managers, finding people who have run fan sites or moderated forums.

This approach is a practical move as such hires bring with them an intimate familiarity with and understanding of the community to be managed. For example, James described how he got started in his first community manager position: I worked closely within the game’s community for about 10 months, and the position of community manager opened up about the same time that I was talking heavily with the company’s president. He dropped me an e-mail one day offering me the position and it wasn’t like I was going to turn it down!

Similarly, Leslie described her path from player of an MMORGP to eventual community manager: “I was hired right out of the community, by my mentor. … I was already doing a lot of community management things, simply as a fan, so that transitioned into working for the company. … I haven’t had any training, as community management is just something you DO, not something you train for.”

Most of our interviewees were hired on after participating in a community for a while; few looked for a community management position specifically, although one interviewee, Robert, did describe how he “intentionally sought out a community management role as it allowed me to interact with [the] community and influencers and make an impact to people not working at my company.” Few of our interviewees received formal training in being an effective community manager, instead picking up the skills along the way or receiving knowledge from mentors: Amber’s experience was similar to many of our interviewees, noting that “most of my training was on the job, being mentored by my teammates and the senior-level CMs.” Justin similarly noted that, “oftentimes, the training is on the job and learning by attempting new things and taking risks.”

While all community managers are, ultimately, communication professionals, there are varying paths of entry that enable access to paid professional work in the field. Degree fields like communications, public relations, advertising, journalism, business, and others all turn out graduates with relevant skills, and as community management has become more visible and more professionalized, the articulation of necessary skills has become more exact, and hiring practices have become more rigorous. The growing gender balance in community management, too, is likely a related phenomenon as 68% of community managers were women as of 2011, but that number had dropped to 61% by 2013 (Keath 2011; 2013).

The majority of our respondents, however, described their path to community management as emerging directly from their participation in gaming spaces, not because they specifically sought out a community management position; as PJ noted, this roundabout path means that many community managers find themselves in that position almost by chance: “I meet so many people that end up in Community Management roles by accident—after a re-org or evolution of their previous role. It would be great to see more people actively pursuing and passionate about Community Management. You will see hard work and great rewards with room to grow but it’s not always easy.”

Effective community management relies on individuals’ cultivation of specialized networking, emotional, and social skills. These often-devalued “soft skills” are fundamental to the work of community management. People are often expected to develop these skills within fan communities before transferring their participation into paid labor, perpetuating a type of bootstraps ideology that the work of play can pay off in some form. More intriguingly, these soft skills are not generally reflected in official job advertisements for community managers, which instead articulate the desire for skills such as effective oral and written communication, analytical
abilities, creativity, leadership, and project management abilities (D’Angelo, 2010). In the next section, we turn our attention to emotional labor and its connection with community management.

**Emotional Labor**

While advertisements seeking community managers attempt to configure these workers as marketing and communications professionals, the means by which such workers are expected to execute their duties overlap with the kinds of emotional labor carried out in the service industry. Hochschild (1981) first theorized the practice of emotional labor and analyzed it in the context of fields such as bill collecting, waitressing, and flight attending in a series of works that were highly influenced both by a Marxist attention to labor and alienation and a feminist concern with emotions, family structures, and social expectations.

For Hochschild, emotional labor is the regulation of emotional expression and display in the context of the workplace. It is also, however, the effort to produce particular emotional responses among clients or customers: A sales clerk at a toy store may be tasked not only with ringing up purchases and helping harried customers find appropriate gifts, but also with imparting a sense of joy and wonder. A requirement of emotional labor is that the employer enacts some control over workers’ emotional activities—as in the phrase “this call may be recorded for quality control purposes.”

As an example, Disney uses courses and training materials to impart to new employees “exactly which positive and esteem-enhancing emotions they must convey” to Disney guests (Morris & Feldman, 1997, p. 259). And, of course, the games industry is well-known for its use of promotional models, commonly referred to as “booth babes,” who are almost uniformly women, at trade shows and events—a highly gendered practice that underscores the overwhelming percent of trade show attendees who are men (Huntemann, 2013, p. 51).

Ultimately, Hochschild argues that emotional labor alienates workers from their own feelings as their emotional actions are regulated and commoditized (see also Morris and Feldman, 1996). Such labor, according to Erickson and Ritter (2001), leads to feelings of inauthenticity and burnout. Further, as these two researchers explore, emotional labor is gendered; women tend to find themselves in emotional labor positions in which they have little control over what is emotionally allowed whereas men tend to be in positions where they have more power over their positions and can dictate what types of emotions they can show (p. 148).

Emotional labor in online communities is further alienating because of the abstraction and then management of emotional labor. Gill and Pratt (2008), for example, argued that Marx’s concept of affective labor helps to account for the knowledge and information work that dominates online work. Affective labor helps to overcome the physical distance of Internet communities and marketplaces (p. 9). Labor becomes immaterial and thus affective (p. 4). In this, Gill and Pratt echoed a much stronger connection drawn by feminist theorist Cristina Morini (2007), who explained that cognitive work is everything which today evokes the extraction of value from the cognitive activities and relationships of human beings—in other words, from knowledge, training, the symbolic apparatus and experiences of each individual person, their creativity and the way they act in a natural spirit of cooperation. If Fordism represents the era of the tangible production of goods and, to that end, uses the strength of the body, cognitive capitalism embodies the era of the production of knowledge through making proper use of the cognitive faculties to form relationships and communicate effectively. (p. 50)

She is very clear here: Individual skills embody the capacity for relationships, emotions, linguistic ability, and an ethic of care (p. 40). Indeed, she could be writing the subheadings of a community manager’s job description.

In a cover feature article entitled “Online Community Management: Communication Through Gamers,” Wera (2008) focused on the value of community managers and what aspiring community managers should do. In the list of recommendations, Wera discussed developing relationships, using good writing and communication skills, caring about what the community says (because they will be able to tell when a person doesn’t care), and in a section entitled “Emotional Qualities,” being what can only be described as an emotional master. These qualities include “patience, empathy, self-confidence (but not too much), teamwork, management skills, humility, rigor, ability to listen, etc.” Yet under this section, the author provides a number of fairly dire warnings to producers and management about the need to treat community managers well and, importantly, pay them well. His warning is not without some merit.

Defined as it is by communication, care, and emotional labor, community management reads as a feminized profession—the work is read as feminine, and often subsequently devalued, even when it is carried out by men, and as Barker and Feiner (2010) argue, many who do this work are often themselves marginalized economically, racially, and culturally. Thus, in an industry that pays early career (less than three years of experience) business and management positions $69,853, the national average for community managers in general is $51,971 (glassdoor.com). And our interviewees spoke frankly about the toll of the emotional labor with which they engaged. Amber, for example, described her feelings of being a “punching bag”:

For every amazing person you meet, there’s someone who hates you and insults you and yells (virtually) at you for things that, most of the time, aren’t your fault. You end up being a punching bag. You see people in the community treat one another poorly, and you have to be “bad cop.”

Roger similarly made a connection between the emotional labor of the position and the pay rates, noting that higher pay would help compensate for the heavy emotional labor required in this position:

Like a lot of jobs that involve dealing with the public there’s a much higher level of emotional stress and hassle involved than people realize. We internalize a lot of that and should be compensated appropriately. Also it’s very difficult to quantify the ROI of a well-managed community. I’ve worked on a lot of subscription-based games and many people continue to play them because of the community.

Finally, Tyson noted how patience is necessary to absorb the stress and emotions of community management: “At times, you will have people screaming at you and you may need to take all of it. If you can handle the situation and make sure everything is calm, you can certainly maintain a community.” Yet it is not just the challenges...
surrounding the feminization and alienation of emotional labor that affect community managers; social labor, too, is exploited, and often this labor is done prior to gaining a position in the game industry without any compensation.

**Social Labor**

In what we term social labor, workers are additionally alienated from their own social interactions and networks. Social labor is the work done in what Terranova (2000) called the “social factory”:

> a process whereby “work processes have shifted from the factory to society, thereby setting in motion a truly complex machine.” Simultaneously voluntarily given and unwaged, enjoyed and exploited, free labor on the Net includes the activity of building Web sites, modifying software packages, reading and participating in mailing lists, and building virtual spaces on MUDs and MOOs. (p. 33)

While Terranova is primarily concerned with the devaluing of knowledge work, we turn our attention to the ways in which we must cultivate and curate social ties in social networks for a specific profit- or job-based end. As such, equally fundamental to the establishment of familiarity with and visibility in fan communities is the expenditure of significant amounts of time contributing to those communities. Candidates for community manager jobs have often participated in activities such as running fanzines, blogs, or websites; assisting with the organization of meet-ups, conventions, or other fan events; or even achieving formalized leadership roles within official channels, such as serving as a volunteer moderator on a company-sponsored forum.

While carried out on an unpaid, enthusiast basis, many such fans apply a high level of professionalism to their activities, and this work exists at a complex nexus. It requires not only time but also a great deal of expertise. People who develop a multi-authored fan blog, for example, must coordinate contributors, review and edit content, and produce their own content; if they are particularly ambitious, they will likely also assume the work of promoting the blog, moderating comments on the site, and soliciting posts from new contributors. This work requires not only an Internet connection but also free or paid web hosting, familiarity with the blogging platform and any social media platforms used, and a degree of savvy in managing a team of contributors.

Individuals engaged in this kind of work are completing a kind of “community service,” although a type that falls outside the conventional scope of the term. They are also consciously cultivating wide-flung networks within their fan communities and establishing themselves as leaders and experts within their chosen fandom. But as De Kosnik (2012) has articulated, fandom activities themselves are often considered recreational activities rather than activities that serve as “a legitimate foundation for a career in the creative industries” (p. 108).

Fandom efforts, however, require and showcase the same kinds of skills prized in the hiring of community managers. They also, at their most fruitful, generate a type of visibility and an established skills prized in the hiring of community managers. They also, at Fandom efforts, however, require and showcase the same kinds of creative industries” (p. 108).

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Fandom efforts, however, require and showcase the same kinds of skills prized in the hiring of community managers. They also, at their most fruitful, generate a type of visibility and an established network of influence and support that can be “value added.” An applicant for a community management position who has worked as a volunteer moderator on a large forum or who has cultivated a significant following on Twitter or Tumblr potentially brings with them their network and sphere of influence. Indeed, advice given to aspiring community managers supports this (see, for example, McGee, 2011; Banks, 2013) and bios of current community managers often mention their previous experience running fan sites. The social connections they have built for themselves, then, become possible corporate assets in the hiring process; after hiring, the maintenance and expansion of these connections becomes a professional obligation. This obligatory building and leveraging of social networks is what we term social labor.

To participate in the voluntary labor of community leadership and moderation in online forums is not, however, simply an exploitation of time. It is also an exploitation of social and emotional labor and skill, of people’s abilities to shape a community, to forge connections, and build networks. This moves toward a “time is money” kind of thinking about connections where connections are the equivalent of money, or at least they could be. The adage that networking is important, that it leads to jobs and opportunities is so well known as to be clichéd, but this system seems to promise a more direct conversion of social connections into capital. The bulk of the monetary capital accrued through these processes, however, does not go to the person who has been incorporated as part of the system; rather, that person then becomes an agent who does social labor on behalf of the corporation. As a result, their networking ability is alienated and turned to corporate goals.

The process at play in the cultivation and hiring of community managers is the aforementioned alienation of social labor. Community managers are often functionally lobbyists, operating as go-betweens for corporations and their fan communities, and are similarly required to operate in a liminal space, no longer part of the fan community that they are now responsible for overseeing and to some extent policing, and often on the edges of corporate decision-making and power. The ways in which these voluntary efforts, often expended toward a community of fans (who aren’t really corporate entities and often operate against corporate goals), are then subsumed by corporate agendas is interesting as this absorption of individuals simultaneously elevates them—they are now officially recognized and given professional status and income based on these abilities—and alienates them as they are removed from their previous context in the community and will likely be reined in by corporate agreements and agendas. ****

Further, community managers may be exposed to dangers or embroiled in controversies from which they may have otherwise escaped. Former community manager Dina Abou Karam was hired by Comcept to work largely with the company’s Kickstarter-funded game Mighty No. 9 in 2013. Because Abou Karam had previously made tweets on feminist issues from her personal Twitter account and had drawn some gender-bent fan art, she was immediately attacked by community members. Though she was a fan of the project and a long-time gamer—much like the other members of the community—at least some community members saw her as not quite familiar enough.

Comcept received enough hostile feedback that the company released a statement that effectively reiterated the definition of a community manager, reassuring fans that the game was not going to be changed to reflect any particular views Abou Karam might have. In 2015, she was still seen as a controversial figure and, in the wake of GamerGate, came under attack by some factions within the game’s fanbase. Ultimately, Abou Karam resigned from her post as community manager in April 2015. Had she not been hired by Comcept, she likely would not have been exposed to this ongoing outpouring of rage, an outpouring that singled her out for ongoing
attacks and both made her more visible within and alienated her from the gaming community.

**Bootstraps and “Playbour”**

Throughout this discussion, we draw attention to the bootstraps ideology that seems to permeate community management. If a person works hard, knows the intellectual property, and cultivates a large enough community, fan labor can become a job. Community managers become the next group in what Postigo (2003) has called post-industrial work. Postigo, who explored the game industry’s modding community as a group that creates material and provides input into the game design process, saw this as a positive influence in the game industry. However, as Küchlick (2005) argued, game modding is a form of “playbour,” a capitalist ideal in which play becomes work and work becomes play, and everything is subsumed under the capitalist ideology of production.

Game modding is the domain of the fan who is willing to spend hours meticulously doing the work of creation. Fansite moderators are doing the work of marketing, and in this, their labor is part of an underexamined aspect of commodity cycles, concerned with production and consumption at the intersection of circulation. This is not playbour—a person’s desire to create something that he or she could play. This is the labor of marketing and circulation—a desire to sustain interest and community involvement to compel production (through demand) and consumption through desire. And these are the skills, often honed without compensation, that companies look for in their hires; each time a company hires a person with his or her own fan community, they hire access to mailing lists, customers, and devoted followers. In the buying and selling of businesses, these lists are worth big money. In the hiring (and firing) of community managers, these lists are merely expected.

This unequal valuation is a fundamental example of the feminization of community management. Skills that are viewed as feminized are frequently undervalued and unvalued, and may in fact become invisible; in many female-dominated fields, workers are expected to demonstrate qualities that are strongly associated with femininity, such as behaving with empathy or nurturing others, but these naturalized abilities are rarely mentioned in job descriptions or made part of formal evaluations of work; in this way, this feminized work is rendered invisible and therefore goes unrewarded and uncompensated (Guy and Newman, 2004). Similarly, the lists and networks maintained by community managers are devalued as they are generated through a feminized process of community building, rather than a masculinized process of cultivating clients or generating business growth—never mind that effective community management has as similar goal as its end. The types of lists generated by community managers cannot be translated into stock options or startup funds even though they may be leveraged for corporate profit.

Active community managers often bristle at their unequal placement within the hierarchy of game development; Donna, for instance, described her feelings of invisibility within the development team and the industry at large, noting how the devaluation of community management ultimately works against the community itself:

> The worst part [of being a community manager]? You’d think I would bring up harassment and trolling. Whilst that is toxic, and you deal with it with your job, it’s actually the apathy and disregard that your development team, executives, and your industry in general doesn’t respect what you do, nor see it as a viable career path. Since they don’t take CM seriously, it can be difficult to try to get what you need FOR your Community. When your company doesn’t respect what you do, or see you as a valid part of development, the players know it. And it creates a hostile community.

Stephen echoed Donna’s points, arguing that

> [It would be nice if people who hire community folk respect them as professionals and understand what their job entails. Sometimes “community” actually means “social media person” but most CMs dig in and do much more than that. They’re not glorified interns and shouldn’t be treated as such. They’re often the direct voice of a brand or company and should be celebrated as a vital part of a company’s online presence. You’d pay a web designer or site creative director a lot to make your site look good. You should respect (and pay) CMs who are responsible for creating your brand online, tweet by tweet and post-by-post.]

This sentiment was resonant among many of our interviewees, like Dean, who argued that respect was key to valuation of the position:

> “If companies and colleagues respected the field more, I know both the quality of community managers and the job satisfaction would improve.”

**CONCLUSION**

In an industry like the games industry that resists feminist critique, it is difficult to embark on a critique of a feminized profession within it—and this is becoming more difficult as men increasingly enter the workforce of community managers. The growing gender balance of professional community managers may help obscure the gendering of that labor as the gender makeup of the field becomes more balanced. However, as Macdonald and Sirianni (1996) theorized, labor may be viewed as feminized regardless of workforce demographics as personal characteristics and skills seen as desirable for positions may carry strong gender connotations. The types of social and communication skills required for effective community management have long been seen as the domain of women, and the connotations of those skills will likely continue to shape the treatment of community management as a profession regardless of what the field’s workforce looks like.

If we accept Humphries’ (2013) assertion that community managers “probably hold one of the most important roles in the industry,” then we are compelled to consider the ethics of labor in relation to this position. After all, wrote Humphries, “without an active Community Manager, you have no community. No community means there will be fewer people talking about your game. The less people talking about your game means less media coverage, less enthusiasm for the game/franchise, and it also gives an impression of poor support from the studio/developers responsible for making the game.” However, community management as paid labor raises provocative questions about the gendering of labor, the role of social capital, and the valuation and devaluation of fan communities. A proper understanding of the social labor required of community managers requires first making it visible. Sometimes, the visibility is required from within the game industry itself, as one interviewee, Elizabeth, articulated:

Elizabeth, articulated:
Having that understanding and empowerment [both from within the organization and within the community itself], as well as visibility, would go a long way to helping CMs do their jobs better as well as perhaps alleviate a lot of the very vitriolic negativity they have heaped on them day in and day out. … Some of my best moments in my career are wins that no one will ever believe happened because of me: advocating on behalf of users to get content that had been announced as canceled brought back and released for free as an apology, DRM policies being changes, patches and fixes rolling out that before we said we would not implement.

Her work as a community manager is often, as she explains, quite literally invisible to others. And while Kris noted the satisfaction of a job well done makes up, for her, the invisibility (“You may not get a tonne of recognition from your company or peers, but you’ll see the work you’re putting in with the community, and how much happier you make them”), we argue that community managers should be able to gain personal satisfaction from a job well done at the same time as they are paid a meaningful wage and given equal respect in the development hierarchy alongside game developers and marketers.

To accomplish greater visibility for community management work, further study is essential. While this article pushes towards a critical framing of community management and the gendered nature of the emotional and social labor involved, such efforts are hampered by limited availability of data and the rapid evolution of community management as vocation. There are, of course, potential pitfalls as well as visibility, would go a long way to helping CMs within the organization and within the community itself, [both from within the organization and within the community itself], as well as visibility, would go a long way to helping CMs do their jobs better as well as perhaps alleviate a lot of the very vitriolic negativity they have heaped on them day in and day out. … Some of my best moments in my career are wins that no one will ever believe happened because of me: advocating on behalf of users to get content that had been announced as canceled brought back and released for free as an apology, DRM policies being changes, patches and fixes rolling out that before we said we would not implement.

Other avenues for future research that are important include

• Articulating the role of business and professional communication courses and/or degree programs in preparing students for future work as community managers (D’Angelo, 2010)
• Exploring the impact of fan-generated content within communities and the community manager’s role in managing that content vis-à-vis intellectual property rights and copyright (Postigo, 2008)
• The function of fast-growing and constantly changing social media and social networking sites in shaping community managers’ job functions (D’Angelo, 2010; Kwon, Min, Geringer, & Lim, 2013)

As the job of a community manager becomes more popular and more diffused in meaning, exploring what exactly community managers do within particular subcommunities (such as gaming communities, as explored here, popular media, consumer brands and experiences, etc.) will allow us to better conceptualize the position of community manager and how the communities themselves impact the work of a manager that is expected—and that is valued.

REFERENCES


**NOTES**

* This doesn’t include quality assurance (QA) testing, in which women make $2,210 more than men.

** This study was exempted by the Institutional Review Board at Worcester Polytechnic Institute, #15-158.

*** All names used throughout are pseudonyms.

**** BioWare has had a particularly fraught relationship with fans, and *Dragon Age* series lead writer David Gaider went so far as to call the atmosphere on the company’s official forums “toxic” a few months after player outrage publicly targeted a member of Gaider’s writing team with misogynistic abuse (Handrahan, 2013; Polo, 2013).
Over, Under, or Through: 
Design Strategies to Supplement the LMS and 
Enhance Interaction in Online Writing Courses

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ABSTRACT
Online writing instruction is a process of design that includes both spatial and temporal dimensions. Ideally, this process brings together design and pedagogy to move students through their online writing work successfully. Institutionally mandated LMS platforms often constrain this process. This article establishes three design principles and concepts for designing learning environments that take into account both space and time as designed elements of online classes. Applying the principles of backward design, modular content, and student choice to course design can help instructors design more thoughtful, participatory classes centered on student learning and instructor presence.

INTRODUCTION
To teach writing online is to design an environment. A virtual classroom has both spatial and temporal dimensions that, ideally, reflect the philosophy of the class and assists students in meeting course learning outcomes. As a designed space, an online course bears some similarities to a face-to-face class. Students enter into and participate in a virtual space that shapes their work and interactions in a variety of ways. The arrangement of that space may support collaboration and dialogue, or it may be designed primarily to enable one-way communication and content delivery. As a designed experience that unfolds in time--usually over a semester or quarter--an online course can be seen in temporal terms as a choreographed sequence of events; rhythm and pacing are vital elements in online course design. This temporal dimension has, to date, not received as much attention as visual and spatial design in research in online course design. Ideally, the online writing class brings together spatial and temporal design with pedagogy to move students through their online writing work successfully.

The purpose of this article is to explore established effective practices for online writing instruction (OWI) and to use those practices to design effective online writing spaces both within and beyond institutionally mandated and supported learning management systems (specifically, Blackboard Learn 9.1, SP6, as of Fall 2016). In particular, we discuss how online writing faculty can work over, under, and through institutionally mandated LMS constraints to design more habitable learning spaces for our students. Our approach assumes that many instructors are, like ourselves, required to deliver courses using an institutional LMS like Blackboard.

Many instructors do not have the time or institutional support necessary to design and create their own course websites. In this context, design strategies that work in tandem with an existing LMS, as opposed to entirely outside of one, are both more practical and likely to be more effective. At the same time, many instructors are, like ourselves, aware of the structural and design constraints of LMS platforms, and are eager to design learning experiences that are more collaborative and student-centric than typically accounted.
for in content-delivery platforms like Blackboard. We propose three primary design principles for online courses that take into account both spatial and temporal dimensions of digital learning environments. We aim to leverage the tools we have (and to work against the grain of the tools given to us) to design more thoughtful, participatory classes centered on student learning and instructor presence.

LITERATURE REVIEW
Technology—including large-scale commercial course management systems—is neither neutral. Any digital platform designs and shapes spatial and temporal relations among users. In the case of the dominant LMS model, the design reinscribes the teacher-centered space of the traditional physical classroom. In other words, an LMS is not simply a tool for the delivery of content to students. The LMS design structures the way students engage with the instructor, the content, and each other.

Scholarly attention to issues of spatial design in online course design has been driven by a corresponding rise in multimodal and multimedia texts in the culture at large. In 2012, the editors of a *Kairos* special issue on Spatial Praxes contended that “our discipline has reached a critical stage in the development of pedagogical praxes as a result of the rapidly increasing media in which we teach and research” (Haley-Brown et al). In part, spatial rhetoric has reached this critical stage for historical reasons. More teachers are composing and designing online spaces, and more students are logging on to those spaces (see Allen & Seaman, 2015). At the same time, technological developments have made it possible for both teachers and students to compose, design, and deliver far more sophisticated, multimodal texts.

This literature review addresses four interrelated issues in the scholarly literature on online course design. We first review the relationships among design, power, and participation in online course design and delivery, where research helps to identify a historical shift taking place around 2010 with the emergence of “Web 2.0” technologies. Then we describe scholarship which argues that institutional decision making has tended to favor large-scale delivery platforms that support a systems approach (as opposed to a user-centered approach) to design. A third section reviews competing frameworks and standards for online course design, ranging from proprietary models like Quality Matters™ to open-source frameworks developed by educators themselves. We conclude by considering more recent work on mobile technologies and related issues of student access to and navigation of content.

Design, Power, and Participation
Researchers have recognized the power issues involved in online course design and delivery (Anderson, 2006; Arola, 2010; Blair, 2007). Arola (2010), in particular, outlines an important historical shift in the relationship between writing instructors and the technologies of online course design. In the 1990s, when online writing instruction and online learning were in their early stages, many instructors were also technologists who embraced the challenge of writing code and designing their own course websites. By 2010, Web 2.0 and social media technologies had reduced the barrier of entry and made it possible for most faculty and students to easily create their own websites and social media profiles using template-driven tools that required no knowledge of the underlying code. Paradoxically, these easy-to-use Web 2.0 tools democratized content and publishing while limiting users’ choice when it came to design. Template-driven, drag-and-drop tools, from Facebook to Weebly, allow everyone to be an author while sometimes reducing design agency to a choice between a few literally superficial “themes.”

Arola concludes with a call to “make design visible”:

Those of us committed to engaging with modes of meaning beyond the alphabetic need to work to bring design to a discursive level so that we, along with our students, become attuned to the ways in which design encourages users to participate in online spaces. If we are to enact a meaningful multimodal pedagogy, then we need to make design visible. (Arola, 2010, p. 13)

Making design visible in the context of an online writing course involves asking students to reflect on and respond to the way course objectives are written and implemented within the online learning environment. Most importantly, making design visible is a way of inviting students to view themselves as co-creators and co-designers of an online course instead of simply as recipients of the content being delivered. Power involves the relationships between instructors and students, and also between instructors, students, and the technology. Arola, in turn, asks us to pay attention to power relations throughout the process; relying on pre-constructed course design templates, while certainly practical for instructors pressed for time in online classrooms, can cede power to the technology or its (often commercial) developers.

Institutional LMSs and Online Course Design
For many online faculty, the primary learning environment is the learning management system (LMS). In the early 2000s, LMSs, and in particular Blackboard, provided a means of moving curriculum online quickly, allowing students to take hybrid and online courses and for online courses to rapidly enter the mainstream. As competitors (such as Wimba, Angel, WebCT, Elluminate, Wimba, NTI Group, Presidium, Edline, Moodlerooms) emerged, Blackboard expanded by absorbing some parts of the competing platforms. Between 2014 and 2015, Blackboard acquired nine additional companies, folding functional pieces of those companies into the Blackboard system (EdTech Business, 2015).

Because LMSs are purchased by systems and institutions, those who select these systems and pay for them frequently mandate and support their use. As Stuart Blythe (2001) identifies, those who design and control these systems fall into one of two categories: systems approaches and user-centered approaches to design (p. 331). In systems approaches, Blythe writes,

[T]he emphasis is on creating a formal specification and then building a system that meets it. Politically, owners who commission those specifications have the most influence over the design of the system; those with the resources necessary to purchase the system have the power to dictate the design, in consultation with the experts they hire to draft the specifications and execute the plan. (p. 331)

A systems approach, in Blythe’s view, creates the environment in which design decisions are made at the institutional level. Decisions made by administration and purchasing, based in a systems approach, result in some of the design constraints and challenges that impede student usability in LMS platforms. Blythe proposes an alternative in the form of a user-centered approach. In contrast to
a systems approach, in Blythe’s user-centered approach to design, designers “create technologies for human use by beginning with the user’s practical knowledge (rather than with a set of formal specifications). In this user-centered approach, specifications emerge from designers’ observations of actual technology use, or, in more participatory instances, they emerge from interaction between designers and users” (p. 332) (see also Bowie, 2009).

However, many faculty may not see themselves as “designers,” either because they do not consider instructional design or web design to be their role, or because they simply do not have time to study the principles of online course design. Even users who might be willing and able to experiment with alternatives to mandated LMS systems are constrained by time and the computer use policies of their particular schools in addition to the labor and political issues within any institution (Reilly & Williams, 2006). Faculty may find that the open and participatory pedagogies with which they engage are sometimes at odds with the institutionally mandated LMS systems. In some situations, faculty must make decisions about moving to or revising materials online so that their roles and presence in online assignments work within and, when necessary, outside of the technologies imposed upon them by institutions, such as a standard LMS (Cason & Jenkins, 2013). However, as Carr-Chellman and Duchaste (2000) note, “the vast majority of online learning materials, particularly those translated directly from residential lecture notes, are behaviorist in nature. Creating constructivist or student-based courses online presents a host of obstacles that may challenge the economies of scale within universities interested in the web as a revenue generator” (p. 148).

As others have pointed out, however, LMS technologies create spaces that are constrained in particular ways that affect and often restrict student access and learning. Beck, Grohowski, and Blair (2016), for example, critique the design of dominant LMS systems (Blackboard and Canvas in particular), arguing that the designs of these virtual spaces “ultimately lead to a confinement of virtual space at the expense of student learning” (Introduction, para. 1). The authors explore design decisions made by the developers of mainstream LMS platforms, concluding that these decisions effectively “reinscribe power dynamics through surveillance practices, constraints upon identity expression, and limited student participatory action” (Section 3, para. 1). Mandated LMS use, while “practical” for institutions, tacitly reinforces the systems approach to design.

A systems approach to online course design, then, stifles Beck, Grohowski, and Blair’s (2016) call for “students and teachers to develop beyond functional users of technology into critical users” (Section 4, para. 2). For students and faculty to be critical users of technology in online spaces, moving from functional to critical literacy in technological spaces (Selber, 2004), all users must be dialogic. And to be in dialogue, teachers and students must be present in the time and space of the class to work within and beyond the constraints of institutional LMS platforms and design and employ learning spaces that achieve this more collaborative model of student-instructor co-creation.

Principles and Standards for Online Course Design

While online writing instructors might seek to design more collaborate online classrooms, they might also need to follow proprietary design principles. A number of organizations have identified best practices in online course design and implementation (Online Learning Consortium’s Online Framework, Chico State Rubric for Online Instruction, Quality Matters). These national standards inform institutional standards and, in some institutions, are the institutional online course design standards. One example used at our institution is the Quality Matters (QM) course certification program (Quality Matters, 2016). The QM program is “a faculty-centered, peer review process that is designed to certify the quality of online courses and online components” (Underlying principles, para. 3). However, the QM design focus and rubrics lead to course designs that meet only the most general design practices of effective online courses. While QM is beneficial for faculty needing to move into online teaching who lack the time to transform face-to-face methods for online spaces, QM requires faculty to have a course fully designed and built before peer review, effectively separating design from delivery, dividing the design space from the temporal delivery of the course (Robinson & Wizer, 2016).

In online writing instruction, national organizations developing effective practices have made strides in combining design and delivery, setting the stage for a more user-centered design. The Conference on College Composition and Communication Committee on Best Practices in Online Writing Instruction (2013) released fifteen practices for effective online writing instruction based on seven years of research into online writing practices. Unlike systems design-based proprietary tools, such as QM, the Position Statement establishes the connection between design and delivery (particularly in OWI Principles 1, 3, 4, 10, and 11). Two principles in particular (Principles 3 and 4) include effective practices that bring together time and space, or design and delivery, for a user-centered experience. In Example Effective Practice 3.9, for example, online writing faculty are encouraged to take full advantage of the flexibility of electronic communications” for “discussions, collaborative work, research, invention activities, and individual and group instruction and guidance . . . using both asynchronous and synchronous modalities.” Principle 2 acknowledges that LMS-centered training is necessary for online instructors, and that training should be conducted by the institution. However, the bulk of the instructional principles focus on the connections between design and delivery, encouraging dialogue between students and instructors about and around the course content (see OWI Example Effective Practices 4.2, 4.3, 4.4, 4.5 and OWI Principle 10).

However, for online writing instruction, Blackboard and other standard LMS systems work against the 25-year body of research into what works in OWI and, at times, constrains the implementation of the OWI Principles. Constraints within the LMS can stifle faculty and pose challenges for user-centered design (see Maid & D’Angelo, 2013; Tillery & Nagelhout, 2013; Ruefman, 2016; Evans & Hardy, 2003; Bradford et al., 2007; for a robust usability test of Blackboard 9.1 SP 3 for accessibility, see Rangin, 2013). Some scholars have used the OWI Principles Statement to design online writing spaces that maximize the available technologies to create rich, user-centered classrooms (Harris, Nier-Weber, & Borgman, 2016) and to improve accessibility for online writing students (Nielsen, 2016).

Others have pushed back against OWI Principle 2, “an online writing course should focus on writing and not on technology orientation or teaching students how to use learning and other technologies,” because the language of the principle separates “writing” from “the tools of writing” (Instructorial principles, para. 2; Friend, Morris, & Stommel, 2016). Effective online writing pedagogy, as
the Position Statement and subsequent work emphasize, capitalizes on what we already understand about the collaborative nature of effective writing and seeks to leverage digital technologies to design writing courses that deliver interactive, technology-rich learning experiences. The Position Statement provides a framework for conceptualizing courses in a way that does not separate design from pedagogy, and that integrates lessons from decades of F2F writing instruction to provide a foundation for online writing instruction as it moves into and through the 21st century. Thus, while research on dominant LMS models helps to better understand the limitations of those models, the Position Statement provides a set of principles that can be used to design more interactive online courses. The Position Statement, in other words, provides the outline of a new model for the design of online learning environments.

**Student Access and Navigation in Online Spaces**

A systems-centered design approach complicates delivery for those online students, particularly online writing students, who increasingly access their courses and complete their work on mobile devices. According to a Pearson study (2013), “four in ten students have used a tablet for school work during the current academic year. Among those who have used a tablet for school work, two-thirds use the device at least a few times a week” (p. 19). A Pew Research study (2015) found that “13% of Americans with an annual household income of less than $30,000 per year are smartphone-dependent.” A pilot study by the Conference on College Composition and Communication Committee on Online Writing Instruction Best Practices (2015) found that one-third of online writing students were frequently or very frequently accessing and completing assignments using mobile technologies. The Principles Statement released by CCCC in 2013 has as Effective Practice 1.6, “Teachers should consider that students may use mobile devices to access the course materials. Therefore, teachers should design the course and course materials according to best design principles that cut across these devices.” While some opponents of mobile learning (or m-learning) criticize mobile devices as “dumbing down” online learning, mobile devices have in fact made online learning more accessible in terms of students’ access to and engagement with content (for additional research on mobile learning in online writing instruction, see Hoven & Palalas, 2011; Kimme Hea, 2009; Rodrigo, 2015; McArdle, 2016).

The disadvantages of Blackboard are nowhere more evident than its limited capabilities with mobile devices. While Blackboard has an app for Android and iOS users, the app restricts users to a limited number of tasks, mostly accessing instructor content, reinforcing a systems design approach to learning. In addition, for the mobile app to work, Blackboard administrators at a school or university need to download a building block, furthering the top-down model of education. While Blackboard seems to offer a range of choices for faculty-student and student-student collaboration, those choices are constrained, largely, to function within the Blackboard LMS as it operates on a desktop or laptop computer. Blogs and wikis can only be accessed and seen by students and faculty within the LMS. Messages within the system do not push notifications outside the LMS, and text editors in everything but the discussion board prevent users from creating hyperlinks to information outside the LMS. None of these collaborative tools can be accessed through the Blackboard App, when and if that App is enabled.

The CCCC OWI Principles Statement invokes space in several of the Example Effective Practices. In several OWI Principles, faculty are encouraged to “migrate” from the face-to-face (F2F) space to the virtual one. Some effective pedagogies convert seamlessly to the virtual space of the online classroom, such as in Example Effective Practice 4.5 where, “teachers should engage learner-centered and writing-intensive pedagogies via electronic means (e.g., collaborative invention and writing, online research, and teacher and peer review of work in progress).” However, Effective Practice 10.1 shows the difference between the physical space of the F2F classroom and the virtual space of the online classroom through encouraging faculty introduce students “to the writing-course specific uses of the LMS” including “where to access their assignments and readings, where to post and retrieve formal writing, where to meet and write publicly with peers, and where to communicate privately with the teacher and peers.” This effective practice highlights the need for intentional, user-based design that helps students navigate the unfamiliar space of online classrooms.

**GOING OVER, UNDER, OR THROUGH THE LMS TO DESIGN SOUND ONLINE WRITING COURSES**

Students enter and exit an online course many times and in different places. Course design can help structure that experience. An effective course design builds a rhythm or sequence in time that helps students learn. We argue for reuniting people in space and time around the act of both course design and delivery for a user-centered design experience. In doing so, we encourage new ways of thinking about and practicing design so that students can effectively access online courses through mobile devices that may or may not work best with web browsers.

Before we begin to elaborate on these points, we must acknowledge that most LMS platforms can be manipulated in such a way that most of these learning goals can be accomplished using only the LMS. For faculty whose institutions mandate that all instructional materials be kept solely in the LMS, these systems can meet quite a number of the components of effective design. However, at its most basic level, LMS systems such as Blackboard, as demonstrated by some of the research discussed above, cater to the lowest common denominator in online design; LMS is a space intended to level the playing field and exempt faculty from the need to understand web design or coding. We will demonstrate how, for each of these areas, faculty can begin in the LMS and then make decisions about how to go beyond the LMS to design effective spaces for online writing instruction.

Where Blackboard and other desktop-based LMS platforms focus instructors on designing larger learning modules and units (akin to chapters in printed textbooks), a mobile, user-centered design approach shifts toward a sequence based on a series of short interventions and activities. A student may choose to log in and complete course tasks in short bursts of time and energy, and a course design can either support or thwart her in doing so. The OWI Principles and Example Effective Practices Statement points to the importance of time in providing student feedback (Example Effective Practice 3.12) and in designing online activities in smaller units, or chunks that “increase opportunities for interaction between teacher and student and among students using both asynchronous and synchronous modalities” (Example Effective Practice 4.1). More research is needed in the area of time and the experience
of temporal design from a student perspective. In our experience, frequent, brief student activities and learning experiences help to build a more vibrant sense of community for students. Frequent brief and low-stakes projects enable students to experience an online course as a living community rather than a static website. In this way, an instructor can design a series of events in time in such a way as to begin to complicate the binary divide between synchronous and asynchronous modes. That is, a course may technically be asynchronous, but students begin to experience it as a real-time, living environment. To students, the course “feels” synchronous.

In the remainder of this article we demonstrate how faculty can design courses that go over, under, or through their sanctioned LMS in order to reach students who are stymied by the technical constraints of the LMS. We frame this discussion around three primary design factors: 1) practicing deliberative user-centered backward design, as opposed to top-down system design, that meets students where they are using technologies that merge form and function; 2) designing chunky, multimodal content that connects space and time for effective, collaborative learning, and 3) foregrounding student choice and opportunity in both the navigation of their online spaces and the times and places they engage those spaces.

**Backward Design for User-Centered Online Writing Classes**

Backward design begins when an instructor re-centers a course around the student instead of the LMS. Course learning outcomes assigned by institutional requirements or standards and used only to meet an institutional or accreditation requirement disassociate the class from the learner, defining what students should know or be able to do at the end of the course without considering how students learn those outcomes by the end of the course. Learning outcomes that are thoughtfully designed, however, form the foundation for backward design.

In backward design, instructors work “backward” from defined learning outcomes for a course, then identify what learning activities will assist students in meeting these outcomes. Once a series of learning activities has been defined, instructors turn to identifying tools and concepts students will need at each step of the journey toward the outcomes. Designing assessment rubrics and composing assignments and processes that attach to the learning outcomes and truly challenge students to meet them, thereby embedding students and instructors and their interaction into outcomes-driven assignments, is a revolutionary act that takes the focus away from the system (surveillance and system design) and puts it back on the learners. Backward design is not primarily technology-driven or outcome focused. It instead uses outcomes as a means to move past institutional requirements and mandated technology and back to user-centered design (also called “humanizing”; see Pacansky-Brock, n.d.).

Backward design, and a corresponding focus on learner outcomes, is a user-centered design principle for several reasons. First, it generally helps to shift from a focus on content (i.e., What am I going to cover in this unit?) to a focus on learner actions (i.e., What is the learner going to need to know and be able to do in this unit?). That shift in perspective has profound effects on the way content is designed and presented in an online course. Second, backward design prompts instructors to think in terms of observable and assessable outcomes. To be effective, learning outcomes need to be written to emphasize active verbs and actionable outcomes that an instructor can see and assess. An outcome that asks a student to “understand the function of logic in an argument,” for example, would be far less effective than an outcome that asks a student to “define logic” and “explain its role in argument.” How would an instructor be able to observe whether or not a student “understands” something? Precise, active language (“define” and “explain”) forms a foundation for the process of backward design.

**Backward design in and through an LMS**

If an online writing instructor is confined to the institutional LMS, s/he can still work through the backward design process. For example, a common course outcome for online writing instruction involves students giving feedback to their peers and receiving and implementing feedback from their peers (see, for example, the Writing Program Administrator Outcomes Statement for First-Year Composition [3.0], 2014). The OWI Position Statement reinforces the need to help students both learn to both practice effective writing processes and to reflect on those processes (See Effective Practices 3.9, 3.10, 3.11, 4.1, 4.2, 4.4, & 4.5). If the instructor begins with the outcome that students should give effective feedback and implement peer feedback, the next step in backward design would be to assign students to respond to their peers’ work and then incorporate their own feedback from peers into the revision process.

While this outcome and assignment seem simple enough, in online writing courses, part of the goal of giving and receiving feedback in peers writing is to help students both 1) learn the types of content that are helpful for their peers and 2) learn the process of providing content for their peers. The former goal can be met in an LMS by asking students to upload a piece of writing to a discussion forum and ask other students to reply in the threaded discussion to give feedback to their peers. This process can also take place in an LMS group, in a blog, or in a wiki, depending on the level of anonymity and control that the instructor wishes to impose.

While Blackboard will allow students to create documents collaboratively in the wiki area, the focus is on the document and not on the process. Learning the process of providing content for their peers may best be facilitated by either synchronous or asynchronous technologies outside of the LMS. In this instance, students might begin in the LMS for peer review guidelines and then move through the LMS to Google Docs, for example, to work with others on the peer-review process. Students using Google Docs can draft simultaneously or sequentially (adding comments and replying to comments). Students can also access the “Revision History” tool to review the history of how they have collaborated on the document, which meets Effective Practice 3.11, “teachers should use the digital setting to encourage students to rhetorically and metacognitively analyze their own learning/writing processes and progress” (see also Kittle & Hicks, 2009).

While we do not argue that Google Docs is a viable alternative to an LMS platform for an entire course, instructors who have the ability to supplement their online writing courses and aim to practice participatory, student-centered design may opt to use Google Docs as a supplement to an institutional LMS. This does not necessarily require more time or preparation than the common approach of using LMS discussion forums as a platform for student peer review and collaborative writing. Google Docs offers a far more useful framework for student collaboration, and many students will need to use it in professional workplaces, so a writing course that helps students practice real-time collaboration in the Google apps...
platform is also practically valuable to students planning to enter the professional workplace.

Similarly, a relatively new peer-feedback tool developed by writing faculty at Michigan State University called Eli Review offers a promising model for merging design and pedagogy. Eli Review extends the capabilities of collaboration software like Google Docs by allowing instructors to design and assign targeted peer feedback activities that work toward specific learning outcomes. For example, an instructor working toward a learning outcome related to the use of claims and evidence in an argument could direct students to respond to peer drafts by looking specifically for claims and supporting evidence. While we are not prepared to offer conclusions on the long-term effectiveness of Eli Review at this time, from a design standpoint, it serves as a very encouraging model of how backward design can be supported and enhanced by a technology or platform. Like Google Docs, Eli Review can be used in tandem with Blackboard rather than as a substitute.

Backward design is one stage in a course design process, and we advocate it as a starting point for any instructor seeking to design student-centered spaces into a writing course. At the same time, backward design points out an important shift: we are moving beyond a time when a single LMS will be workable for all students in all situations, toward a new, more flexible model that sees technology as an ecosystem of interlocking tools and applications rather than as a single, one-size-fits-all platform. Google Docs and Eli Review clearly point to instructional potential not available to instructors working entirely within Blackboard or a similar LMS.

**Connecting Space and Time through Chunky, Multimodal Content for Collaborative Learning**

Modular, or “chunky” content helps students learn, whether they are reading on a mobile device or on a larger screen. Brief mini-lessons can use visual and auditory modes as well as text, creating instructional content that is multimodal as well as accessible to a wider range of students. Multimodal content makes learning more accessible and engaging for different types of learners. Using smaller “micro-lessons” followed by a variety of activities can increase the frequency of student-to-content, student-to-student, and student-to-instructor engagement in an online course. In addition, short, chunky activities can mitigate the problem many online instructors face when online students are inactive for the first few days of a week and then suddenly are overly engaged at the end of the week.

Some students have been conditioned by experience in other online courses to expect to be able to read and study quietly by themselves for a few weeks, post a minimum number of discussion board posts in a single day, and complete an exam or writing assignment at the end of a unit or module. The chunky model, with its frequent required interaction, may disappoint students who want to be able to proceed more independently. For that reason, we encourage students to reflect and comment on the process as we go along. We make design visible by asking students to engage and respond to the course content and design in real time. Inevitably, some students will express resistance, arguing that they enrolled in an online course specifically to be able to “work on my own schedule.” So it is important to take those concerns seriously and encourage students to express them. In a writing course, we argue that students can measurably benefit from breaking major writing projects into a series of steps that can be completed in short units of time.

In practice, applying the concept of chunked content in course design can work in many ways. For several years, we have been using backward design and creating course schedules in which writing activities were usually due on the same day each week. We discovered, perhaps predictably, that most students were logging on to post writing the day assignments were due. This created a rhythm where activity in the course community spiked one day each week, followed by a period of quiet in between. In our recent courses, we have moved to design schedules where short, work-in-progress tasks are due two or three times per week. While the total net amount of writing students do has not changed, breaking the writing into two or three mini-activities has helped to create a more constant flow of activity and discourse in and around the course environment.

**Chunky, multimodal content in and over the LMS**

For instructors limited to an LMS, content and time can be chunked using tools such as Adaptive Release, where students must meet a particular learning outcome before they can access the next assignment, reading, or activity. For example, students can take a short, multiple-choice quiz to demonstrate their knowledge of the content before getting access to a discussion board or writing assignments. However, for adaptive release to work, students either need to get a particular score on a multiple-choice test (which reduces learning to memorization at best, or encourages them to use a textbook or the internet to quickly find answers at worst) or they need to access a particular area (which does nothing to guarantee they have learned the information, only that they have viewed the resource). Adaptive learning is excellent for helping students work toward mastery of concepts, but those using this feature to chunk must be careful not to reduce an online class to a collection of individual studies where students work only independently at their own pace.

For those faculty with a bit more flexibility, they can use external web tools to embed content over the standard LMS to provide more multimodal instruction than the LMS might allow. Multimodal instruction supports chunked content by providing students with multiple points of entry into each unit or module. For example, we design course units around a weekly structure, in which each weekly module opens with a text overview as well as a video preview (instructor screencast) to explain the concepts and assignments for the week. The text overview and the preview video cover roughly the same material, and students can choose which medium they prefer to use to get started each week. While we recognize that LMSs may have embedded video creation tools (such as Kaltura), we opt to create multimodal videos using tools like YouTube, Vimeo, and Embed Responsively, which allow instructors to upload videos and make them available to students on mobile devices, regardless of whether the students are logged in to their course LMS or not.

The combination of multimodality and chunked content design proves to be both challenging and powerful for instructors. Thinking in terms of 5-minute mini-lectures and tutorials instead of 50-minute class sessions challenges us to sharply define the learning goals and key concepts for a particular unit. By no means is this an easy or trivial task, and we do not want to downplay the amount of time and energy required to do so. The results, however, are very encouraging. And as increasing numbers of mobile-first students enter our classrooms, designing content and course activities in this way can only increase student engagement and involvement in online courses.
Giving Online Writing Students Choice and Opportunity in Space and Time

We challenge faculty to design online writing spaces where students are creating the conversation and shaping online spaces. This method is akin to what F2F faculty do when they set up small circles of chairs in a classroom and then challenge students to create what happens in that space. Miller-Cochran and Rodrigo (2006) concluded that “simplifying design, directing learning, and facilitating multiple access to the course” allowed faculty and students to experience “the Web as a multifaceted environment that allows students to slip in and out of the class, sometimes without even realizing it” (p. 103). This last user-centered design experience asks faculty to design online writing courses neither so students access a set of writing templates and models (which is demoralizing) nor ask students to click a simple pathway that masquerades as freedom of choice while actually leading to a predestined outcome.

Three concrete ways to provide students choice in both space and time in an online class is 1) have students choose from among different assignments, 2) have students choose between mediums of communication with peers and the instructor, or 3) allow multiple pathways to navigate content in online course design. Any of these three choices allow students to both take ownership of their learning and feel less like passive recipients in the online course.

Giving students content and medium choice

When they write or create content, even a simple summary or recall prompt, students retain far more than if they were to take a multiple-choice quiz. When students have opportunity and choice, when they are asked to both write and comment, thinking meta-rhetorically, they are in effect becoming the teachers. We give them concepts they need to think about. We ask them to study rhetorical appeals and other foundational concepts of the discipline, and then they capitalize on and facilitate learning in the form of content creation. The focus of the course not faculty-driven content-creation; the core of the course is the interaction between students and faculty, which remains behind a firewall. Embed responsively (http://embedresponsively.com/) is a website that instructors (and students) can use to create embed codes that are “responsive” (i.e., they adapt to any size of screen or viewport). So a video uploaded to a Weebly site, for example, can “flex” to fit any screen size from large monitor to smartphone. Instructors can upload a video to YouTube or Vimeo, then copy and paste the link from that service into Embed Responsively, which in turn generates a snippet of custom code that can be pasted into a course website.

Giving students navigational choice

One way to meet all three of these goals at once is to allow students to enter a course from multiple points: from an email, from their LMS, from a course schedule, or from an external website.

Again, faculty whose institutions require students enter through the LMS might at first seem limited by set navigational structures—in particular, the left navigation button or link system that is the bedrock of almost every major LMS system. However, once faculty can effectively learn to embed and hyperlink to other areas of the internet, the LMS becomes not a set of constraints but rather a portal to experience the Web as the “multi-faceted environment” that Miller-Coehran and Rodrigo describe (2006, p. 105).

One way to both work through an LMS but also allow students freedom of choice in navigating pathways that work for them is to think of the LMS as not the container of the course experience but rather as the hub of course experience. In the hub concept, the LMS becomes a portal to 1) learning content (which can be hosted in a Google Doc, in a Weebly or other WYSIWYG site designed by the instructor, or another external content site; 2) collaborative writing and discussion spaces (such as Google Docs); and 3) the LMS itself (which houses FERPA-protected information, such as the students’ grades).

Because all websites (including the LMS and Google Docs) are just hyperlinks that are (at their heart) code, students could navigate to a course through multiple pathways through:

- An LMS-generated announcement that includes hyperlinks to content. The announcement will reside in the LMS announcements area but can also be sent to the students’ institutional email accounts. The announcement can contain hyperlinks to external content (such as a course website hosted in Weebly), or to Google Docs or other collaborative spaces where students can move directly into a learning task, asynchronously or synchronously.
- A course schedule that includes hyperlinks to content, readings, and activities. One example might be a Google Doc that is a course schedule with hyperlinks to the course Weebly site (where content is housed, to sections of a Blackboard site (such as a course discussion board), and to videos, documents, and or learning spaces.
- An externally-hosted website, built with Weebly or a similar platform. For students who use mobile technologies primarily or mostly, the ability to begin navigation at a site like Weebly (which allows faculty to design a course that is automatically tailored to be seen on tablets, phones, or laptop/desktops) allows them to access content on the go.

Configurations that allow students to use a variety of tools for completing assignments creates learning situations where students can use their own physical time and space differently. One example from one of our classes is Amber, a student who during an online advanced nonfiction course was driving every day from one city to another during a period of transition for her family. Amber was allowed to complete discussion boards by:

- Accessing the discussion board before she began driving (on her iPad)
- Opening a Google Doc and using Google Voice to speak the text of her posts
- Editing the text on her iPad once she reached her destination
- Uploading the discussion posts to Blackboard once she reached her destination.

Her posts were generally longer, more well-developed, and more related to the subject matter of the course than some of her peers who squeezed their discussion board time into a few minutes they had in the evenings or weekends around their already busy lives.

Conclusion

Our final thought, appropriately, is adapted from a Tweet from user experience designer Dana Chisnell’s Twitter profile: “If you want users to love your design, fall in love with your users.” In online writing instruction, if you want students to fall in love with your course, fall in love with your students. And falling in love with
them begins by building courses they need using a design made for them to flourish. We have ample evidence now, drawn from online writing instruction specifically, as well as from the wider world of user experience design, that good learning design begins when we start asking our students what they need and how they need it. Design strategies in online writing courses begin at the level of deep structure (information architecture), based in an understanding of what students need to learn, and how they will work toward defined learning goals in our courses. Implementing this concept of learner-focused course design requires instructors to push against the boundaries of the walled space of dominant LMS platforms.

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The Problem of Multimodality: 
What Data-Driven Research Can Tell Us 
About Online Writing Practices

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INTRODUCTION

The pedagogical application of digital writing, specifically requiring students to compose in open, online spaces, has grown steadily over the last two decades along with a rise in institutional and financial support. Course management systems, virtual learning environments, and ePortfolio platforms designed for multi-user collaboration and consideration are among such online spaces that are increasingly used for educational purposes. While educators continue to reevaluate underlying assumptions about student writing in online open spaces, they need evidence to determine if and how students are using the affordances of digital platforms. This study was designed to provide “RAD research” – or replicable, aggregable, and data-supported (Haswell, 2005) – in order to ground the assumptions made about online writing pedagogy in tangible results.

Within this context, ePortfolios offer a particularly advantageous area of exploration for this research since they often hold vast archives of student writing along with relevant pedagogical materials. This study focuses on the use of WordPress as an ePortfolio platform at Macaulay Honors College, an elite program spanning eight of the twenty-four City University of New York (CUNY) campuses; however, the research questions are applicable across institutional contexts. The guiding questions for this study are as follows:

• How prepared are college students to compose in online, open spaces for educational purposes? How does their previous personal experience with digital technology impact their ability to develop digital literacy skills in higher education?

• What are the characteristics of student writing in online, open spaces? How does the interface/platform impact the writing students compose in that space?

• How does assignment design (i.e. the language used, the objectives, and/or the criteria) shape the resulting student work?

• How are these characteristics similar and different in writing across the disciplines? Specifically, how do they compare
when the subject or content of the writing emanates from humanities/art courses and from science/technology courses?

The results presented here are intended to inform administrators and instructors who work in writing studies or instructors across the disciplines that wish to integrate digital writing platforms into their courses more effectively.

This article offers both language and data to use when making arguments for campus-wide support of online writing programs. By providing evidence indicating that explicit instruction needs to be accompanied by formal requirements, this article concludes with specific actions instructors can take in order to guide students through the process of responsibly and reflectively incorporating multimedia into their writing. Supported by testimonials and verified by close readings, this article demonstrates how to structure a data-driven inquiry into a born-digital archive of student writing. In so doing, it supports the validity of computational analysis of student-produced work.

**LITERATURE REVIEW**

There are a host of constituent assertions that support the use of open online writing platforms in college-level courses. These claims include that writing in public venues cultivates digital literacy through broader audience awareness, facilitates interactivity and collaboration between peers, and supports the creation and integration of multimedia artifacts into the writing process (Stevenson, 2006; Yancey, 2015; Shipka, 2011; Palmeri, 2012). This article seeks to address the validity of those claims, specifically the impact of assignment design and platform-specific affordances on student composition practices, by examining the writing mode, multimodal aspects, and folksonomic elements of digital composition at Macaulay Honors College (commonly called Macaulay).

**Process Theory**

Grounded in process theory and constructivist pedagogy, this study examines the mode of writing and the multimodal elements of student composition in both low and high stakes assignments (Elbow, 1997) across general education seminars in the humanities and sciences. Peter Elbow defines this distinction as follows: low stakes assignments are personal, and not weighted heavily in terms of assessment, where as high stakes writing is formal, written for an outside audience, and assessed as a significant portion of the final grade for the course. The reason for examining a variety of assignments from each course emphasizes the dedication to value process over a final product. For the purposes of this article, the origins of process theory stem mainly from “Writing as a Process Not Product,” (1972) wherein Donald Murray advocates for the move toward evaluating a student’s oeuvre over the course of a semester, rather than hinging assessment on a final exam, project, or writing assignment. In this way, process theory and portfolio pedagogy have always been linked, dating back to the first wide-scale portfolio program started by Peter Elbow and Pat Belanoff at SUNY-Stony Brook in the 1980s.

**Portfolio Pedagogy**

As an alternative to high stakes testing, portfolio design aimed to present writing as a recursive process, and therefore assessed development through a variety of student-produced artifacts framed by reflection. As portfolio programs increased in popularity – and indeed a recent survey found that 50% of institutions of higher education use some form of portfolio (Yancey, 2016) – there was a need to assess the efficacy of this approach.

Since the archive of writing used as data for this study is contained in an ePortfolio system, studies on student writing based on process pedagogy served as a model for this study, beginning with the work of Janet Emig and Sondra Perl in the 1970s. Claiming that proof of a writing process gleaned from anecdotal conversation with professional writers was idiosyncratic at best, Janet Emig’s work attempts to address the dearth of research on student writing. Therefore, in The Composing Processes of Twelfth Graders (1971), Emig systematically observes eight twelfth grade student writers, collecting data on their composition techniques while they describe their writing process out loud, and then analyzes the autobiographical essays they produce. As a result Emig establishes two modes of academic writing which serve as a basis for this research project: the reflexive mode, which is personal, introspective, and experiential, and the extensive mode, defined as analytical, objective, and informative.

This study updates Emig’s model by applying the terms and methods to a much larger set of born-digital student compositions gleaned from an undergraduate program. In the ubiquitous computing era, the paper-based practice of portfolio pedagogy has largely moved to online spaces due to the logical affordances digital platforms can offer in terms of disseminating, organizing, and archiving student work. Emig’s original definitions needed to be updated to match the particular dynamics on the digital space. In an online forum, reflexive writing has a wider potential audience, and therefore even personal writing can be read by anyone with access to the site. In fact, the public forum fundamentally changes the rhetorical situation of the composition.

Bringing this form of reflexive student writing to a public, online forum, expands the audience to include the college community, family and friends, and future employers, but also enables the writing to be read by the world at large. In the coding phase of research, low and high stakes posts were coded as either reflexive or extensive based on this modified definition that acknowledged both modes are written for an outside audience. This method is intended to identify how students address audience awareness in their online writing, and to assess disciplinary differences in the mode of writing students employ in both low and high stakes assignments.

**Digital Literacy**

Unlike paper portfolio assessment, which concentrates solely on writing skills, the evaluation of an ePortfolio should also address web-based skills. To emphasize what Jason Palmeri terms the “multimodal turn” in rhetoric, this study considers the cultivation of technological fluency specifically through the use of WordPress in a general education curriculum (2012). In addition to the mode of writing, student compositions were coded for various multimodal and folksonomic elements, such as their use of images, videos, tags, or categories. For the purposes of this study, folksonomy is broadly defined as an informal taxonomy implemented by users through tags, categories, or commenting. The goal is to identify elements that increase the accessibility and “findability” of information. These elements were chosen as evidence that students are engaged in building “digital literacy,” defined by Paul Gilster as “critical selection and evaluation” and “reflective competence” rather than “purely technical skills” (1998).
In order to assess digital literacy as a practice it is important to understand the level at which students entered the program. As Kathleen Yancey (2009), past president of the National Council of Teachers of English, writes in “Writing in the 21st Century: A Report from NCTE”: “[w]ith digital technology and, especially Web 2.0, it seems, writers are *everywhere*,” and that “[o]pportunities for composing abound—on MySpace and Facebook and Googledocs and multiple blogs and platforms—and on national media sites, where writers upload photos and descriptions, videos and personal accounts, where they are both recipients and creators of our news” (pp. 4-5). Yancey claims that in the 21st century students are constantly creating multimodal compositions in digital spaces, although the range of venues may be more limited than Yancey suggests.

As a response to Yancey’s call for more research on the composing strategies of 21st century students, the authors of “Revisualizing Composition: How First-Year Writers Use Composing Technologies” (Moore et al., 2016) conducted an extensive study of the composition habits of 1,366 students from seven colleges and universities. Statistics cited in the article show that “[s]tudents regularly use a range of technologies when composing, but they—not surprisingly—use them for different purposes.” More importantly, the researchers conclude that “[w]e need new models of composing and new pedagogies for teaching writing, because as the following results show, students have much more fluid ways of using composing technologies than we typically acknowledge in our writing pedagogies” (Moore et al., 2016). The survey of Macaulay students provides the same insight into the composing practices of a small subset of college students.

### The Digital Native Myth

In order to better understand this population, the Macaulay survey (2004) was informed by Maura Smale and Mariana Regalado’s report (2014) on the use of Information and Communication Technologies (ICT) by students at six of the CUNY campuses. In their article “Commuter Students Using Technology,” Smale and Regalado report that while “[d]espite constant connection to friends and family via text messaging and social networks, students’ experience of and preparation for using technology in their academic work was uneven—not just in their online research skills but also in their proficiency with basic productivity, word-processing, and presentation software” (2014). Additionally, recent scholarship on social media use, such as It’s Complicated: The Social Lives of Networked Teens by danah boyd (2014) and “Examining Digital Literacy Practices on Social Network Sites” by Amber Buck (2012), debunk the “digital native” myth. Although the findings confirm that majority of American teenagers have social media accounts, boyd and Buck argue that many have a very limited understanding of those platforms and struggle to translate those skills into an academic context.

Both of these texts argue that many educators—and in fact society as a whole—wrongly assume that so called “millennials” have innate digital literacy skills. However, based on extensive interviews with teenagers across the country, boyd and Buck both found these assumptions to be false, and instead unearthed a lack of confidence using digital tools, and in some cases a fear of technology, across study participants. Confirming these conclusions, the survey of Macaulay freshman demonstrates that while students have experience composing in online spaces previous to entering college, they struggle to apply this digital literacy practice in an academic setting.

This study builds on previous OWI (Online Writing Instruction) research by combining writing skills and digital literacies under the umbrella of composition. By asserting that successful online writing requires an understanding of rhetorical strategies, multimedia incorporation, and the use of folksonomic elements this research pushes the discussion of OWI into areas of design thinking and web development. Furthermore, the use of data-driven analytics alongside traditional methods, such as interviews and surveys, offers an intervention in OWI methodologies.

### METHODS

In order to address the research questions presented in the introduction, this study required a multivariate research design. The research questions are as follows:

- How prepared are college students to compose in online, open spaces for educational purposes? How does their previous personal experience with digital technology impact their ability to develop digital literacy skills in higher education?
- What are the characteristics of student writing in online, open spaces? How does the interface/platform impact the writing students compose in that space?
- How does assignment design (i.e. the language used, the objectives, and/or the criteria) shape the resulting student work?
- How are these characteristics similar and different in writing across the disciplines? Specifically, how do they compare when the subject or content of the writing emanates from humanities/art courses and from science/technology courses?

Information about the students’ previous experience writing in online spaces, student writing composed for general education courses using the ePortfolio platform, and assignment prompts provided by the instructors all needed to be collected and analyzed. Data was collected through a quasi-experimental empirical research study based on a survey of first-year students, a distant reading of student writing, and analysis of instructor provided pedagogical materials. The combination of these materials speak to a gap in the current scholarship on online writing by addressing the relationship between assignment design and the inclusion of multimedia and folksonomic elements in composition across the curriculum. The intention is to provide data-driven evidence of student-centered digital literacy practices gleaned from a long-standing and well-supported online writing program. The results demonstrate that students entering college are not “digital natives” who can successfully compose digital texts without explicit instruction and support.

### The Survey

As Kevin DePew argues in “Through the Eyes of Researchers, Rhetors, and Audiences: Triangulating Data from the Digital Writing Situation,” textual analysis alone can “limit researchers to informed speculation” (2007, p. 55). Therefore, a survey was created to address the myth that students enter college with a set of digital literacy skills that instructors can reliably expect students to execute in an academic setting (see Notes). Built in Opinio—a survey platform that provides secure data collection - the electronic survey was distributed to freshman enrolled at Macaulay in a weekly newsletter distributed via email, and reminders to participate were given by the ITFs in the first year seminars. This method enabled...
data to be collected from the greatest number of freshman at the earliest stage of their exposure to the Macaulay ePortfolio platform. The intention was to collect data on their experience composing in online spaces prior to entering college while ensuring that they had a basic familiarity with the terminology associated with digital writing. At the time of distribution the students had completed coursework in their first seminar using the ePortfolio platform with formal instruction from their professors and support from the Instructional Technology Fellows (ITFs).

The consent form and survey questions were composed in collaboration with the ITFs to ensure readability, and the Institutional Review Board (IRB) approved both before distribution. There were a total of eleven main survey questions, and several of these prompted follow-up questions if answered in the affirmative. Aside from the first three contextual questions, presented in a Y/N format, the substantive questions asked if the participant performed a specific act, and if so, how often (with options provided). Questions were arranged from simplest to most complex, and from general to more specific, as suggested by Empirical Research in Writing by Mary Sue MacNealy in her chapter on survey methods (1998). Also as MacNealy suggests, the questions were grouped by topic, and the format of each question was similar to all previous questions (1998).

Over 150 students participated in the survey, although not all of the participants completed all of the questions. This represents over 20% of the targeted population. As defined by The Writing Studio at Colorado State University, this is not a true experiment since a strict control group is impossible, for reasons including uncontrollable variation in the respondents’ demographic and educational history, as well as the researcher’s bias as a participant-observer. However, the Macaulay program does offer a particularly advantageous set of controlling factors that shaped this case study. Every student admitted to the honors program receives a new Macintosh laptop, full tuition, and the assistance of ITFs. Macaulay does not accept transfer students, so all of the students in the general education courses are traditionally aged and recently graduated from high school. To verify this information, the survey asked students to identify their age, the high school they attended, and what languages they speak (indicating which is their primary language). These factors ensure that all of the students are the same age, speak the same language, and have access to a personal computer, similar software, and support in using these tools.

**Text Analysis**

While the survey of incoming students provided a broad overview of student exposure to digital tools prior to entering the Macaulay Honors Program, the assignments produced by students in the required honors seminars augmented and refined initial impressions. Over the past decade Macaulay has maintained an archive of over 3000 course sites created through the honors seminars, which provided a rich archive of student writing to data mine for this project. Student compositions were randomly selected and were coded and analyzed through a combination of text analysis and close reading. The student writing in particular, gathered through the student ePortfolio system, represents “quantitative descriptive” data; MacNealy (1998) terms “quantitative descriptive” as data that is qualitative but can be counted. Taken individually the compositions are rich in descriptive, qualitative data, but the archive as a whole demonstrates patterns described quantitatively. By using online writing produced in the general education seminars as a source of qualitative data, this method enabled a comparison of mode and media inclusion across the disciplines (research question number 4).

With permission from the administration and the IRB, access was granted to only those sites that are public for the purposes of this research project. The relevant information was extracted from the WordPress database for use by the researcher and organized into a new database for the purposes of this study. Without examining the context of each site, a large-scale data analysis of content from the WordPress database would not have led to insights concerning the language of the assignment, the resources provided by the ITF and instructor, and the nature of the engagement that produced the post because this information is obscured by the distant reading process. Therefore, selecting a smaller subset and separating the posts into assignment and student product enabled a deeper understanding of the rhetorical situation.

From the archive of Macaulay ePortfolios, eight sites created during the 2013-14 school year - the same year that the survey was administered – were selected for coding. The eight sites originating in writing intensive courses and contained assignment information provided by the instructor in order to determine two interrelated factors: first, whether the assignment was low or high stakes and second, as a point of comparison between the instructor’s directions and the student compositions. The spreadsheet created for this project was created to sift through this data by breaking the content down by course, student, and assignment, as well as coding columns for each assignment post. These columns correspond to the research questions for this project but are designed to be reusable by any researcher interested in identifying mode and media types extracted from a born-digital archive of writing (see Notes).

**The Coding Process**

The coding process illuminated the structure of the course sites, the kind of events students attended, the role of the ITF and instructor, and the class’s community engagement. Writing samples were extracted from a randomized selection of students and coded each sample to indicate the writing mode, multimedia usage, and folksonomic elements of digital composition. The coding schema broke down these three elements into nuanced sub-categories that further enable any researcher to replicate this process for a similar data set (see Notes). A randomly selected six out of a possible twenty-two students from each seminar were chosen as a representative sample from each course section. Then a low stakes assignment (one worth 20% or less of the course total completed early in the semester) and a high stakes assignment (worth more than 20% and part of the final project), were selected for coding.

To compare how students write across the disciplines and across different kinds of assignments, textual elements were coded as either extensive or reflexive. Once the mode of student writing was determined, the posts that contained multimodal elements were coded and then further distinguished by the type of media —video, image, audio, or infographic. The database indicates whether the students created the media themselves or imported it from an outside source. The posts were also coded for folksonomic elements: categories, tags, and comments. Evidence of both the inclusion of media and the use of folksonomic elements were intended to help determine whether students transferred the digital literacies cultivated through the use of social media into their academic work.
SURVEY RESULTS

As discussed in the literature review, Yancey’s thesis is that educators can and should tap into the seeming desire to write displayed by the student’s constant use of digital technologies to produce multimodal texts, and translate this writing experience into our classroom practices. In order to do that, educators need to find out where and how students are writing outside the classroom and find ways to transfer those skills into an academic context. As Smale and Regalado claim, “despite the persistence of the digital native image in the media, however, not all college students own and use these technologies to the same extent, which can hamper their ability to use ICT effectively for academic purposes” (2014).

In order to determine the preparedness of Macaulay students to use the Wordpress platform in their coursework, a survey was given to incoming students inquiring about their experience composing in online spaces prior to entering college. The data was compared to CUNY-wide and nation-wide surveys (Smale and Regalado, 2014; Lenhart, 2015; Moore et al, 2016), which found similar results: while many students have personal social media accounts, and there is an increase in exposure to digital technologies at the 9-12 grade level, most students have difficulty applying their digital literacy skills at the college level. As Moore et al. argue, “Even though the nature of texts, textuality, textual production and reception, and the writing lives of students have changed drastically, we are, as Yancey (2009) claimed, still teaching writing like we taught it 100 years ago” (2016). This research study found that many students did not feel comfortable using new tools or implementing digital literacy practices in their coursework at Macaulay, unless explicit instruction was provided. This provides data-driven evidence that even honors students educated in urban institutions do not match the digital native myth, and therefore our institutions of higher education need to be prepared to support students in the development of these skills if they consider them essential learning outcomes.

The survey provided to Macaulay students assumes generalized Internet access for college-aged Americans based on nationwide survey data and the CUNY-wide data collected by Smale and Regalado. Therefore, the questions focus on which web-based platforms Macaulay students use to compose and for what purposes (see Notes). Questions 4 and 5 of the survey of Macaulay freshman provided a list of the most popular social media platforms to participants with the intention of capturing as many sites as possible, not just those that the students might remember and name on their own. The sites listed were selected by researching which social media sites had the most traffic and users at the time, and those search results were compared across several sources.

The survey identifies which social media sites the students had accounts for and how frequently they used the sites with the intention of understanding what kinds of sites they use most often. According to this survey of 150 Macaulay freshmen, 90% of students who participated have social media accounts, although the results of the survey also indicate the dominance of a few social media sites, despite the variety of options (see Figure 1).

Figure 1: The Results of Question 4 of Survey Distributed to Macaulay Freshman.
This percentage confirms that just as nation-wide research (Moore et al., 2016; boyd, 2014) and the CUNY-specific research (Smale and Relgalado, 2014) indicates, Macaulay students write on social media sites, whether they are conscious of the implications of that practice or not. The majority of respondents in this survey indicate that they have a Facebook account; Facebook is a social media site (founded in 2004) available to anyone over the age of thirteen who agrees to the terms and conditions. A 2011 Pew Internet & American Life Project indicates 93% of social media users ages 12 to 17 have an account with the social network company Facebook (Madden et al., 2013). Results of the Macaulay survey match the Pew findings, confirming the assumptions that the majority of college students communicate in online spaces.

The results of Question 4 in the survey indicate that Instagram is the second most popular social media platform among Macaulay freshman, followed by Tumblr. Both Instagram and Tumblr are image-driven platforms. Users of these sites typically share their original photographs and videos or “re-post” images shared by another user. The use of text on both of these sites is typically minimal, but the use of folksonomic elements such as tags is very common. Therefore, it is safe to assume students have a basic understanding of how and why tags are applied to digital content.

Further, the results indicate that the technological education Macaulay offers its students in composing in online open spaces using the ePortfolio system is building off of pre-existing exposure to and experience with not only text-based composition, but also other kinds of media, including audio, visual, and folksonomic elements like tags. There is a clear need to guide students in how to transfer their digital literacy practices from their personal lives into an academic context. With respect to digital literacy, the high percentage of students who reported using social media sites also suggests that educators have an opportunity, if not a necessity, to inform students on the benefits and consequences of composing online because they may not be aware of concerns about privacy and data collection, or the way that filter bubbles and search algorithms manipulate access to information.

The use of social media sites serves as an entrance point to questions that specifically addressed the use of blogging platforms and the level of literacy students had with blogging technology. The next set of questions examined the use of digital writing spaces, specifically blogging platforms, for educational and extracurricular purposes. Moore et al. report that students seldom compose on blogs compared to other mediums—only 600 of 5714 cases reported—but when they do use blogs, it is for entertainment or personal use, not for educational use (2016). Unfortunately, only 78 students responded to this question in the Macaulay survey, but of those the survey found that 42% of respondents report that they used blogs for educational purposes prior to entering Macaulay (see Figure 2).

The data gathered from this survey indicates that less than half of incoming students are likely to be familiar with a blogging platform similar to the one they are asked to use in their four required Honors seminars at Macaulay.

Additionally, only a small number of students are familiar with using blogging platforms for personal use before entering Macaulay, and even fewer have hosted their own website. Only one respondent hosted a personal website on a private server; only one purchased

![Graph](image_url)
a domain name; and only one wrote code using a programming language to develop the site. Of the thirteen respondents who provided additional information about their blogging use, twelve used a blogging platform, and in the comments provided the names of the following web services: Wordpress, Blogger, LiveJournal, Tumblr, and Fatcow. The first three are blogging platforms similar to the platform used by Macaulay. While only a few students report familiarity with blogging for personal or academic use, these numbers could increase be due to New York City’s evolving Common Core technology requirements.

As of January 2016, the current “Common Core Standards for Writing” state that students in grades 9-12 should be able to “[u]se technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information” (CCSS.ELA-Literacy.W.11-12.6). To ensure that all New York City schools comply and assess the Common Core Standards, the Department of Education has created common curriculum maps that lay out each assessment standard with suggested assignments. This document, specifically asks students to create a digital text that includes outside research and media. The prompt reads:

Create a blog post using information from your research paper and various multimedia components to enhance your research findings. Update or enhance the information

<table>
<thead>
<tr>
<th>Course</th>
<th>Seminar 1: Arts in NYC</th>
<th>Seminar 3: Science &amp; Technology in NYC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section</td>
<td>Professor A: Baruch College</td>
<td>Professor C: Macaulay campus</td>
</tr>
<tr>
<td>Low-Stakes Assignment</td>
<td>“blog posts will describe, analyze, contextualize and evaluate the art, performances and readings you seek out and experience”</td>
<td>“select peer-reviewed scientific journal articles to summarize and report on in 400-500 word posts”</td>
</tr>
<tr>
<td>High-Stakes Assignment</td>
<td>“As you post on the blog and make entries in your scrapbook, look for themes, issues and stories that particularly interest you, and connections and through-lines that you see in your various posts. By the second half of the semester, you will identify a topic for a larger research project that you want to pursue in your oral presentation and final project.”</td>
<td>“The end of unit assignment for Unit 2 is a group video project related to doing science in the city [...] The goal is to produce a 2-3 minute video presenting scientific concepts for a public audience. You can chose to make this the public face of your poster research project or something more general about doing science in the city. There will be time during class to work with your group and our ITF on this project. It will be graded on a four-point scale and is 20% of your final grade.”</td>
</tr>
<tr>
<td></td>
<td>“Create and post an Aesthetic Interaction as your final project.”</td>
<td>“For our final project, students unite what they’ve learned about informal science in the classroom with an informal science project in the city. Each group is responsible for creating a digital artifact, a co-authored paper, and a website that documents the project’s process.”</td>
</tr>
</tbody>
</table>

Create a blog post using information from your research paper and various multimedia components to enhance your research findings. Update or enhance the information.
from your research paper by linking to other supporting information and displaying the information flexibly and dynamically. Make effective use of available multimedia components, including hyperlinks, images, graphics, animation, charts, graphs, video, and audio clips. (CCSS. ELA-Literacy.W.11-12.6).

The “9-12 English and Languages Arts Curriculum Map” was recommended, but not required in the 2013-14 school year, and was required by the 2014-15 school year. Therefore, if high schools complied with this recommendation, then students who were in their first year at Macaulay in 2013-14 were more likely to have been exposed to blogging and multimodal composition in their high school course work, and future freshman would very likely be familiar with blogging before they enter college.

Despite the anticipated increase in exposure to online writing platforms in an academic context prior to entering college, this study found that explicit instruction is still needed for each assignment given at every level of education. Further analysis done by mining the student writing and instructor provided assignment prompts archived on the Macaulay ePortfolio platform revealed that students do not transfer their digital literacy practices into an academic context unless extensive support is provided.

**TEXT ANALYSIS RESULTS**

All Macaulay Honors College students are required to take four general education seminars: “The Arts in New York City” (Seminar 1), “The People of New York City” (Seminar 2), “Science and Technology in New York City” (Seminar 3), and “The Future of New York City” (Seminar 4). Each of these seminars utilizes the ePortfolio platform in a different way, ideally matching the objectives of that course designed by Macaulay and implemented by the instructors. Of the four required seminars at Macaulay Honors College, two were chosen for this study to provide a comparison between student writing in humanities courses versus science courses. The first course examined is Seminar 1, which is the first course taken in the fall term of freshman year. This course represents humanistic inquiry and is intended to provide students with a foundational knowledge in art, literature, music, and theater. The second, Seminar 3, is taken in the fall of sophomore year and is grounded in scientific inquiry.

Table 1 breaks down the four courses selected for this study and the descriptions of the low and high stakes assignments provided by the instructor. The course numbers, names of the professors, and the names of the students have been removed and replaced with non-identifying letters and numbers.

Each of the posts collected from the course sites was coded as either reflective or extensive as determined by the updated version of Janet Emig’s definitions. This system of coding enables a comparison of the how students communicate in the digital space across assignments within one course, across different sections of the same course, and across the disciplines. Comparisons across different sections of the same course, in particular, provide insight on how the site design and assignment language influences student production. Therefore, this section is organized to aide the reader in comparing the mode and media in two sections of the same seminar before moving on to the two sections from the next seminar.

This next section is divided in order to help readers draw comparisons across the disciplines. The first section will provide results and analysis regarding the writing mode and media inclusion in student compositions collected from the humanities.

The structure is as follows:

**Humanities Course A**

- **Mode**
  - Low Stakes
  - High Stakes
- **Media**
  - Low Stakes
  - High Stakes
- **Analysis**

The next section parallels this structure for the student writing collected from the sciences. Analysis resulting from comparing writing across the disciplines follows in the “Conclusions” section.

**THE HUMANITIES**

This section presents the findings and analysis of data collection from Seminar 1, “The Arts In New York City.” Since these courses take place in New York City, Macaulay uses this opportunity to make Seminar 1 immersive, and the school has cultivated relationships with many cultural institutions that give discounted tickets or free admission to Macaulay students. It is up to each instructor to incorporate planned immersion trips and to design a syllabus with a variety of readings and research assignments that augment the cultural experiences. Since professors of English, Art History, Theater, Fine Arts, and History from eight different undergraduate institutions within CUNY teach this course, the objectives are broad guidelines meant to give instructors freedom to design their syllabi based on their expertise. However, the guidelines emphasize writing, observation, analysis and reflection. The language of the course objectives instruct students to “construct clearly written and well-reasoned analyses” and “formulate their own individual aesthetic values,” which suggests that the resulting assignments would include a mix of reflexive and extensive writing as student blogs moved between reviews of cultural experiences and the analysis of specific works of art.

Student writing collected from the two representative Seminar 1 course blogs is divided into low and high stakes assignments as described in the methods sections. Data results presented below focus on evidence showing patterns in the writing mode and media inclusion in these humanities based courses. Information from the assignment sheets provided by the instructor informs this analysis.

**Course A**

**Mode**

*Low Stakes Assignment.* Professor A’s Seminar 1 taught at Baruch College in Fall 2013 (hereby known as Course A), asked students to compose blog posts based on nine prompts that mostly emphasized cultural immersion experiences. For the first sample of student work from Professor A’s Seminar 1, the first low stakes assignment selected was completed early in the semester filed under the category “Transcultural Moment.” The language of the assignment states, “blog posts will describe, analyze, contextualize and evaluate the art, performances and readings you seek out and experience” (“Assignments”).
Although the rhetoric in this assignment suggests students could write in either the reflexive—"describe" and "experience"—or the extensive—"analyze" and "evaluate"—individual prompts led students to default to the reflexive mode. All of the posts under "Transcultural Experience" used the first person singular to describe a moment in the student's personal history and reflect on that based on the class discussions and readings on the topic. All six posts coded under this assignment prompt were written in the reflexive mode. Most were very personal, describing familial relationships, cultural traditions, and emotional reactions to periods of acclimation.

For example, this excerpt demonstrates the type of reflexive writing composed in response to this assignment. NOTE: The texts extracted from the student posts included in this article are presented without alteration. Any errors are intentionally included, based on Peter Elbow's argument that student writing is just as critically valid as any academic writing and should be approached from a respectful place.

My whole life the mixings of cultures seemed normal to me. I was raised on rice and beans and matzo ball soup. The sounds of my father's Spanish and my mother's Yiddish accent mixed together in my head like music. It was not until I got older that I began to see the how people of different cultures separate themselves from each other, and when cultures combine it is a special moment. (Student 1)

This post from Student 1 has all the hallmarks of reflexive writing. Evidence from all the posts collected from this course suggest that through this form of personal writing, students encounter diversity at a personal level that can internalize abstract concepts. Asking students to reflect on course content through personal experience in a public forum concretizes the theoretical concepts introduced by the professor or through course readings—in this case a "transcultural moment"—through a variety of perspectives. Furthermore, sharing this form of reflexive writing can help to form a community within the class by creating bonds and connections between students.

High Stakes Assignments. The high-stakes assignments for Professor A's Seminar 1 course primarily used non-textual media. The assignment prompted students to collect materials throughout the semester and then extract a research question from a pattern or theme they identified. Posts contained videos, images, and sound, but very little text. A number of the posts produced to satisfy the "Final Presentation" assignment in Professor A's course contained a brief description of the project, all of which were all written in the extensive mode. The students' posts focused on framing their projects and showcasing their conclusions. Written in a formal, academic tone, the descriptions were clearly aimed at an external audience. Many posts also incorporate research from outside sources. For example, Student 2's final presentation post integrates outside research to define terms and support analysis of the audio clips presented in the post:

Although it may not have a distinctive quality to it, maqām Rast gives off feelings of pride, proudness, and power (Touma). The very word “Rast” is seen as being similar to the Hebrew word “Rosh” which means “head” or “beginning.” It is believed that this is the reason why Rast is used whenever a new weekly Torah book is to begin that week (Blanco). (Student 2)

This post has all the hallmarks of the extensive mode: it is informative, analytical, and directed toward an external audience. Aside from presenting research, this student utilizes written text to explicate the significance and offer an interpretation of the audio clips posted for the final project. In doing so, this student demonstrates the ability to compose in a formal writing style while effectively incorporating media.

In other final presentations, students in Professor A's Seminar 1 demonstrate their use of the extensive mode orally through video or audio clips posted on the course site. Additionally, Professor A remarked on the student presentations in the comment section, which provided information about the level of research and professionalism delivered during the in-class presentation. These materials were considered when determining which posts were
extensive and which were reflexive. All of the high stakes posts in Professor A’s course were written in the extensive mode except two: one that contained mostly images and another that could not be coded because of a broken video link.

As honors students, this set of freshmen may arrive at Macaulay with greater academic preparation and knowledge than the average CUNY student. Therefore, it is unsurprising that the honors students in Professor A’s Seminar 1 strove to meet the more formal and analytical standards of scholarly writing by composing in the extensive mode in response to a high stakes assignment that would greatly affect their final grade. Even when an assignment is framed to be reflective and experiential, students who are enculturated into the norms of academic standards default to a more formal, impersonal tone in their compositions.

Media
Low Stakes Assignment. Neither of the low-stakes assignments in the Seminar 1 sites coded for this study contained language that specifically requested the use of multimedia, nor did the assignments utilize media in the instructions. Considering the posts coded for the “Transcultural Moment” assignment were very personal in nature, a photograph of the student, their family, their neighborhood, or their favorite food all would have been appropriate here — and would have enhanced the post. Had this been a post on social media the audience would expect an image, video, or slideshow to accompany the text. Of the 6 posts coded for Professor A’s class, one student includes a self-created video, one included a self-created image, and one included an external image. The lack of media in the low stakes posts may be explained by the corresponding “Scrapbook” assignment that asked students to collect their pictures under that category. The “Scrapbook” section of the site appears to be a place for students to collect media from their journey through the seminar, but it may have discouraged the integration of media and text.

Typically in Seminar 1 courses, the ITFs and instructors collaborate to decide how the site should be organized before the course begins and then to designate what categories each assignment should fall under. Ideally, the way to use the features of WordPress in order to build intuitive information architecture is explained to students. Otherwise, it is not obvious to students that categories can be menu items and that these decisions are deliberate and have a significant impact on the user experience of a WordPress site. The design of the site influences how students organized their work. In Professor A’s course, ITFs gave students instructions on how to categorize posts, which ensured that each composition was posted to the correct section of the site and created a useful drop down menu of the post categories (see Figure 3).

The drop-down menu contains all the categories used to sort the student posts by assignment, making the site easier to navigate, and showing the students how adding categories can translate into a more intuitive user experience. Even though these categories were most likely supplied by the ITF or instructor, understanding how these keywords affect the information architecture of the site is an important digital literacy skill.

Despite the presence of categories in Professor A’s Seminar 1 site, none of the posts contained tags. Again, students should be familiar with the practice of tagging through the prevalence of this convention on social media. Just as categories directly affect the information architecture of the site, the use of tags would make the posts easier to search, and it would be easier to identify recurring themes in the posts if the students would have utilized this feature of the WordPress platform. Additionally, WordPress themes often default to include comments sections, which need to be turned off manually if the creator prefers not to have a commenting space. These commenting spaces provide an opportunity for students to respond to each other asynchronously, continuing discussions outside of structured instructional time, and extend the possibility for outside readers to join the conversation as well. Both of the Seminar 1 course sites contained commenting functions on all posts, yet none of the posts included comments by the community of students or outside readers.

Arguably, commenting features constitute one of the primary goals of prompting students to write in a public, open online space: the ability to share, read, and comment on each other’s work outside of class time. Interaction is a key objective in integrating the blogging platform into a digital writing curriculum. Without that interaction—and the inclusion of media and tags—the students might as well write individual papers turned into the professor alone. Like tagging and including multimedia, commenting is also a digital literacy that can be cultivated through the use of social media; the practice of commenting or responding to a post is a common occurrence across all social media platforms. Therefore, fostering the use of folksonomic elements and respectful commenting practices are digital literacies that have a clear application outside the classroom.

Course B Mode
Low Stakes Assignment. Similar to Professor A’s Seminar 1 course, all of the low-stakes posts collected and coded from the section taught by Professor B were written in the reflexive mode. For this course, posts from an excursion trip to the 9/11 and Vietnam Memorials in New York City were coded for the low stakes assignment because it was an given early in the semester as part of a collection of posts on field trips taken together as a class. Like the posts on Professor A’s site, the student responses were emotionally charged and opinionated. In one post, the student connects a previous experience visiting the memorial in high school with the class trip for her Seminar 1 at Macaulay, noting the emotionally similar response:

When I went to visit the 9/11 Memorial last year with my senior class, we were each assigned the name of a victim to research so that we could all feel more personally connected to our surroundings. One by one, we all read several short lines for each victim that will forever be the legacy of those who perished in the brutal terrorist attack a few short years ago. The memorial’s vastness made me feel tiny and helpless in comparison. The rushing water drowned out my senses and all I could hear was static all around me. I remember feeling upset, confused, and overwhelmed. Contrary to what I was expecting, I felt similar emotions when we visited the Vietnam Memorial last Thursday. Having no personal connection to Vietnam whatsoever, I thought all we would be seeing were some gruesome pictures and memorabilia from the war. I thought wrong. (Student 3)

The rhetoric employed by this student is not typical of a formal, graded, academic assignment requiring the objective analyzes of a historical site. Instead, the language conveys personal observations
and initial reactions, both of which are hallmarks of the reflexive mode of writing. By focusing on a collective experience, this assignment invites students to appreciate the difference each brings to a physical and emotional encounter with history, art, and architecture, thereby satisfying one of the course objectives expressed by the Macaulay guidelines.

High Stakes Assignments. In both Seminar 1 courses, the final, high stakes assignment included an in-class presentation that was not captured on the site, which made it difficult to code the writing mode of the students’ compositions. In the section of Seminar 1 taught by Professor B, all of the final projects were videos produced by more than one student in groups. After listening to each video, content was coded as reflexive or extensive based on the discourse used by the students in the videos. In contrast to Professor A’s course, all of the final projects coded for this section were presented in the reflexive mode. Students shared opinions and debated verbally in these videos. They based a large majority of their claims on personal experience, although they occasionally mentioned resources from the course content to support their opinions. The video posts did analyze the works presented, but in the superficial, surface-level manner of a novice observer, not of a well-researched expert. Because Seminar 1 is an introductory level course, in which the official course objectives emphasize how students relate to and experience art, this final project and level of discourse is appropriate.

Media

Low Stakes Assignment. The second Seminar 1 site coded for this study is similar in structure to the course taught by Professor A. In “Arts in New York City” taught by Professor B at Brooklyn College, students posted reflections on field trips taken together as a class and individually. These posts are also arranged by category, and content can be searched by content category or by author through the right side menu (see Figure 4). Again, students were provided categories by the ITF and professor, which could serve as an introduction to information architecture. While all of the posts contained categories, none of the posts included tags.

The course site contains rotating images in the header, a class picture on the “About” page, and introduction videos in the first post assignment. Therefore, the space itself encourages multimodal composition. However, this low stakes assignment did not require media through the use of specific language in the prompt, and the results demonstrate the consequences. Since the low stakes assignment centered on a cultural immersion trip to the 9/11 and Vietnam War memorial sites where students were encouraged to take pictures, the expectation was that these posts would contain media. However, only two of the posts contained student-created photographs, and none of the posts contained videos. When participating in Seminar 1 as an ITF, I attended this field trip to the memorial sites and witnessed students documenting the excursion with their phones. Considering both my experience and the knowledge that the students had just completed the “Night at the Museum” event, the lack of media is perplexing.
**High Stakes Assignments.** The requirement to use multimedia in the high stakes assignments was explicit in the language of both Seminar 1 course sites. In Professor B’s section of Seminar 1, students created final projects in groups, and all of them were short videos that were posted to the course site under the category “final projects.” Professor B had students build off the initial Smart History project from the “Night at the Museum” event to create videos that combined audio and visuals to highlight student conversations about an artistic object. It is worthwhile to note that these videos all contained multiple mediums, such as images, music clips, voiceovers, as well as showcasing video editing techniques. That the student-produced videos include many different types of media means the students are applying the skills learned in the common events to their coursework. Furthermore, four of these posts included tags, all of them had instructor comments, and one had a comment from a classmate. While only a minor shift, over the course of the semester the students and instructor increasingly utilized the functions of this particular platform. The final projects on both sites showcased products that fit the medium; the final projects are multimodal, interactive, and cumulative.

**Analysis.** Overall, 18 of the 24 posts analyzed were composed in the reflexive mode, and only 4 were coded as extensive. The question remains if this tendency toward reflexive writing is shaped by the medium or the course content. The “Arts in New York City” Seminar certainly focuses on observation and reflection, but the course objectives also highlight analysis. Both Professor A and B emphasize analysis in their syllabi and assignment descriptions, yet the results show less “well-reasoned analyses” and more personal insights based on experiential knowledge. This discrepancy could be the result of the way the medium influences the analytical nature of student composition: paper versus a Microsoft Word document versus videos. In the survey administered to Macaulay students, the majority of those who reported using a blogging site for academic purposes did so in humanities-based classes, therefore the reflexive mode demonstrated in the posts written in both Professor A and B’s seminars could be due to their previous experience posting content in their high school English and History courses. However, results of the Pew Research Report “Part I: How Much, and What, Do Today’s Middle and High School Students Write?” found that both students and teachers did not associate blog posts with academic writing, and therefore, despite the fact that students are informed that these posts are evaluated as part of their grade, they may not understand that online composition is a form of academic engagement. The academic discipline, whether students are working in a humanities or science class, may also have some effect on the mode of student composition. Finally, the language of the assignment itself and the instructor’s explanation of it can be one element of the calculus students use to determine whether they need to adopt a formal, academic tone—the extensive mode—or a personal, experiential tone—the reflexive mode.

Since the assignments posted to the course sites provide only minimal or no explicit instruction on the formality of these low-stakes assignments, the students may default to the kind of rhetoric they use on social media. Or the students could simply find it easier to speak from personal experience and convey an emotional reaction since more subjective writing can be more difficult to grade. However, the students participating in the honors seminars arrive at Macaulay with above average test scores and academic preparation; consequently, it seems unlikely that they are avoiding formal academic engagement by writing in the reflexive mode. My experience working as an ITF with seminar students taught me that honors students are, in fact, more comfortable with formal, impersonal writing that follows strict guidelines if they know the writing will be evaluated. Therefore, this type of personal, reflective engagement with the subject on a public forum that will be read by their classmates and their instructor is a form of risk-taking, typically reserved for private writing spaces and unshared or unevaluated pre-writing activities.

Even though the vast majority of students who participate in Seminar 1 know how to share media because of their personal social media participation and are further taught how to use multimedia in an academic setting by their ITFs, students’ low stakes posts do not indicate the transfer of these digital literacies related to media; only five posts included multimedia like images, videos, or links or the use of folksonomic elements like tags and comments (see Figure 5).

Most of the low stakes posts did not contain multimedia, and very few included tags or comments; however, all of the posts included categories. The use of categories but lack of tags, media, and comments can likely be explained by examining the rhetoric of the assignment prompt as delivered orally and in writing. Elements that were required and supported through formal instruction from the professor or ITF show up in the student posts 100% of the time. Elements that were either suggested or not required are often entirely absent.

![Figure 5: Summary of Totals from the Coding Spreadsheet Showing How Often Students Use Multimedia and Folksonomic Elements in their Compositions](image-url)
Students consistently used more media in their final projects than in their low stakes posts, but again the higher rate of use excludes tags and comments. This result could be due to a lack of time or effort put into assignments that carried less weight and were due more frequently, or due to a gap in technical competency. However, adding media does not require advanced WordPress skills and the low stakes posts do not read as deficient in effort. Many of the low stakes posts are very thoughtful and well written. Therefore, most students do not engage with the multimodal and folksonomic aspects of the platform unless specifically required to add media, tags, or comments by the instructor, even if they have the skills to do so.

In the posts composed for high stakes assignments, eight contain student images, ten contain external images, five include student videos, seven include external videos, seven integrate student audio, and seven include external audio. This marks a significant shift from the low stakes post, which confirms that the language of the assignment has a meaningful impact on student work. The posts from Professor A’s class also demonstrate the use of a wide variety of media when no specific tools were required, whereas all of the high stakes assignments from Professor B’s seminar contained videos.

Expectations are that high stakes assignments will be composed in the extensive mode because final research projects are characterized as being more analytical and informative. Yet, the final multimedia projects – the audio files and reflexive videos – produced in both humanities courses do meet the requirements of the course by allowing student to use close observation and conversation with their peers to formulate their own opinions. One explanation for the divergence in expectations and experience coding the final assignments produced in Professor A’s course is the medium’s influence on student work. It is possible that because the students, working in groups, created videos and not text, they adopted a more reflexive tone to mimic what they perceived as a more informal assignment and working environment. However, a similar assignment coded for Professor C’s science-based Seminar 3 course also required students to produce group videos, which were all executed in the extensive mode. Therefore, the reflexive tone used by the students in Professor B’s Seminar 1 is likely a result of the instructor’s encouragement and expectations of this humanities-based course.

THE SCIENCES

The last course in the series, “Science and Technology in NYC,” is intended to introduce the scientific method through place-based research. Students all attend a “Bio-Blitz” at a local park and collect data through a mobile application about the wildlife and plant species that inhabit that place. This course is taught by instructors with a wide range of specialties, from chemistry and biology to computer science and sociology, and therefore each class has a different theme and course readings. All of the students present their final research at a public presentation organized to mimic an academic conference.

The structure of this section is as follows:

Humanities Course A

- Mode
  - Low Stakes
  - High Stakes
- Media
  - Low Stakes
  - High Stakes
- Analysis

This section parallels this structure for the student writing collected from the humanities.

THE SCIENCE FORWARD TIMES

THE PROGRESSIVE SCIENCE DAILY FROM MACAULAY HONORS COLLEGE

Seen on Nature’s Runway: Stripes

Wednesday, October 7, 2015

You go shopping for clothes and a striped collared shirt catches your eye. It’ll be the perfect touch to the dapper look you’re going for. Its thin vertical bands moving across the fabric will complete your outfit for a perfect day out in Williamsburg. Turns out stripes or bands also work this way in nature. They help certain organisms such as the Anartia fatima, a butterfly commonly found in tropical areas blend in with their surroundings.

The Anartia fatima has a cream-colored band running along the dark brown internal area of its ventral wing surfaces. The location and contrasting color of this band can help decrease predation by creating something called a false boundary effect. This false boundary breaks up the animal’s outline.

EDITION

1st Edition – Fall 2013
2nd Edition – Fall 2014
3rd Edition – Fall 2015

JOIN THIS BLOG!

Welcome to Science Times!

Figure 6: The Science Forward Times from Professor C’s Seminar 3 Course Site.
Course C

Mode

Low Stakes Assignment. The first set of compositions coded for Seminar 3 were collected from Professor C’s “Science Forward 2014” offered in Fall 2014 at the Macaulay campus. This robust course site included a number of web-based assignments with extensive assignment descriptions, which proved particularly helpful in the coding process. One of the low stakes assignments worth 10% of the overall grade in this course required students to select peer-reviewed scientific journal articles to summarize and report on in 400-500 word posts. The assignment did not, however, require the use of multimedia. These posts were aggregated into the “Science Forward Times,” a section of the course site that was published using the online newspaper theme in WordPress (see Figure 6).

The technical effects of this newspaper were most likely achieved by the two ITFs assigned to this ambitious course, in collaboration with the professor. This particular section of this course was designed as a pilot for future Seminar 3 courses after Macaulay changed the course description in spring 2013. The coding process determined that all of the posts for this assignment were composed in the extensive mode using a journalistic style appropriate for the prompt. Here is an example in which the student summarizes the main ideas of the source article and cites appropriately:

One of the main flavor-stimulating ingredients in many cuisines is salt, especially in fast foods. Salt makes our foods taste great and is in our daily diet. About thirty percent of the people in the United States suffer from hypertension, high blood pressure, and it is also nicknamed the most prevalent chronic disease in the world. Many of the past researches tied the string between salt and the rise of blood pressure; however, a recent study conducted by Graudal, Graudal, and Jürgens claims otherwise. The recent research shows that the amount sodium intake has no correlation to higher blood pressure in many of us and either high or low sodium diet will not affect patients with hypertension at all. (Student 4)

In this post the student reported on the content of the article critically with the intention of reaching an external audience. The academic approach, a fundamental element of extensive writing, was common throughout the low stakes posts composed in Professor C’s Seminar 3. Unlike the low stakes assignments coded for Seminar 1, these posts do not use the first person perspective nor do they rely on observation or emotional reactions. Although the posts may include experiential knowledge—such as the acknowledgement of the prevalence of salt in our diets—the majority of the content summarizes the source material. This course is an outlier; most of the low stakes content coded for this study, in both the humanities and the sciences, was written in the reflexive mode, a fact that undermines the assumption that students write reflexively in short blog posts because the medium shapes their engagement with the writing space.

High Stakes Assignments. All Seminar 3 courses culminate in cross-campus conference at which students give a final presentation to an audience of their peers. In Professor C’s Seminar 3 course, the final project consisted of many smaller, scaffolded projects leading up to the common event. As it was not possible to code the group presentations given orally at the common event, the final “Video Essays” served as the next best option. This assignment was the precursor to the final presentation made by the same groups on the same topic. According to the assignment sheet, “the goal is to produce a 2-3 minute video presenting scientific concepts for a public audience.” Again the expected was that the videos would be composed using the extensive mode. Indeed, that expectation was met; all of the videos coded for this assignment were composed in the extensive mode in an informative and analytical tone. Although the students spoke about their own experience as researchers, the videos explicitly addressed an external audience with the intention to provide reliable information about a scientific observation. At least two of the videos included interviews with experts in the field, and all of them contained an introductory level of data analysis at minimum.

Media

Low Stakes Assignment. None of the posts coded for Professor C’s Seminar 3 course contained media or folksonomic elements of any kind. As stated previously, this assignment directed student to create a newspaper, more specifically “a news essay in the style of the NY Times Science section” based on an article from a peer-reviewed journal published in the last two years (“News Essay Guidelines”). For this assignment there seems to be a fundamental disconnect between the intent and the results: newspapers contain media, yet the student work does not. While the layout and design of the student newspaper mimics that of a traditional media venue, the absence of photographs, infographics, and videos is jarring for a reader accustomed to popular online news sources such as The New York Times. In this case, neither the design nor the objectives of the assignment seemed to influence the students’ use of media.

Although the language of the prompt did not specifically require the inclusion of media, the prompt does instruct students to “look at the figures presented in the results section to get an idea of the main results” when choosing an article, insinuating that most scholarly articles in scientific journals include media as well. Indeed, venues for scholarly communication in the sciences are increasingly multimodal, and if instructors intend to prepare students for a future in this field then digital publishing should be emphasized in the curriculum. Furthermore, the assignment prompt suggests that students “include quotes from scientists or other people that may be affected by the science in the journal article. You could ask me or your other science professors for commentary” (“News Essay Guidelines”). If students conducted interviews using audio or video recording, they could have included these materials in their news essays. This would also have helped the students practice the skills they needed to hone in order to complete their final video essay assignment. There were several missed opportunities to enhance student’s digital literacy practices in this assignment.

High Stakes Assignments. In contrast to the low-stakes assignment, all of the students in Professor C’s Seminar 3 filmed videos with their own original audio as part of their final project preparation. A video essay is a multimedia project by definition, and this assignment specifically required student-created footage and audio. Additionally, all six of the videos coded for this class included external images, and four of the six contained external audio as well. The combination of original and external media requires the students to edit their videos using advanced digital literacy. The fact that these Macaulay students were able to accomplish this editing work for this project is not surprising because they all have experience using iMovie on their Macbooks from the Tech Fair event held in the first week of freshman year.
As seen in the Seminar 1 sites, these video creation skills are also often employed in the humanities-based seminars at Macaulay. The ability to implement these skills in more than one course for a variety of purposes does show evidence of transfer, but this evidence is only consistently apparent in the high stakes assignments. Considering the evidence that students are exploring the use of multimodal elements primarily in their high stakes assignments, this indicates that both the requirements of the assignment and the time given to complete the assignment are significant factors in determining how and why students use media in their digital writing. Unfortunately, the use of folksonomic elements remains underdeveloped; the video posts for Professor C’s Seminar 3 projects were all marked with the same category, but none of them included tags or comments. A tag cloud would make this site easier to search, and the comment feature could have been used to increase discussion among the students, ITFs, instructor, or members of other sections of Seminar 3 across Macaulay. Knowing that this course had two ITFs, I wonder if these options were suggested or if the ideas were discussed and willfully ignored or voted down.

Course D

Mode

Low Stakes Assignment. In this section of “Science and Technology in New York City” taught by Professor D, the low stakes assignment prompt implicitly suggests students write reflexively, hewing more closely to the standard mode of student composition in low stakes assignments. In this assignment, students were asked to “bring your perspectives about the readings to bear in the reflections” about an article provided by the instructor each week, in order to “improve your critical reading, thinking, research, and writing skills” with the “secondary goal to learn more about yourself and others as science learners” (“Welcome”). This description primarily supports the reflexive mode while still promoting elements of extensive mode simultaneously.

The coding process revealed that all six samples were written in the reflexive mode, which differs from the low stakes posts produced in Professor C’s section of Seminar 3. For instance, writing in response to Professor D’s prompt, the student focuses on the article they reviewed through the lens of personal experience:

> I completely agree with what the authors had to say in the article. Science should be learned through doing, not just reading and sitting in a classroom. As I child, I believed that if I crammed, memorized, and studied different scientific topics that I would truly grasp them. I learned that through that method, I would forget all the topics I learned within a few months. Exposing myself to a more practical method of learning that was more hands on allowed me to form a stronger long term memory of each topic. (Student 5)

Although this student directly engages, and quotes from, the source material just as students did while composing posts for Professor C’s section of Seminar 3, this post relies on experiential knowledge over research. The posts coded for the section of Seminar 3 taught by Professor D are far more personal in nature and typical of the reflexive writing mode. This indicates that the wording of the assignment prompt impacts the results despite potential perceptions about disciplinary tradition or how much an assignment will affect the final course grade.

High Stakes Assignments. The section of Seminar 3 taught by Professor D required a final website project. Students worked in small groups to create their own websites that contained their research blogs, related media, and a final research paper. Each site is very distinct from the others: the students chose their own themes, layouts, research topics, and content. This project allowed students to display a wide range of digital literacy skills, specifically concerning the use of WordPress. In order to execute this assignment, the students needed to understand how to build a basic WordPress site, customize the site to meet their needs, and add a variety of content to the site using an organized structure. Many of these skills were developed in the mandatory final website project in every Seminar 2 course (“The People of New York City”), but the products created in response to Professor D’s assignment show that students can transfer what they learned in previous courses and apply it to across academic disciplines.

The sites created for the final project in Professor D’s section of Seminar 3 are difficult to code since they are highly multifaceted. Therefore, for the purposes of this study, the coding process focused on the research essay in order to determine the mode of composition. The description of this assignment on the course site states: “For our final project, students unite what they’ve learned about informal science in the classroom with an informal science project in the city. Each group is responsible for creating a digital artifact, a co-authored paper, and a website that documents the project’s process” (“Final Project”).

The key word in terms of predicting the writing mode is “informal,” which would indicate the responses could be composed in the reflexive mode. However, formal research papers almost always infer extensive writing. Perhaps it is the intuition, conditioning, or training of a typical Macaulay Honors Student, but all of these co-authored research papers were composed in the extensive mode. This confirms that disciplinary expectations affect student composition style, but conflicts with evidence that the language of the assignment matters more in regards to how students formulate responses. It may be that the phrase “research paper” carries a great deal of weight in terms of connoting formal, academic writing, such that even a suggestion that the tone be informal cannot break this conditioning, especially with honors students.

Media

Low Stakes Assignment. Despite students’ previous experience, none of the low stakes posts for the assignment in Professor D’s Seminar 3 course contained media, tags, or comments. In fact, none of the low stakes assignment across either section of Seminar 3 coded for this research project contain any multimedia. Again, this is likely because it was neither suggested nor required in the assignment prompt. The prompt states that students should use this opportunity to “learn more about yourself and others,” indicating an openness and flexibility in the expectations of the instructor and an opportunity for the students to be creative and unique. Yet, because these responses are based on readings, it is reasonable that students focused on comprehension and correctness rather than creativity.

The language of the responses coded show that students did use very personal language to describe their experience, which again presents a missed opportunity to incorporate images of their experience to enhance their work. However, all but one of the posts included categories, and several included more than one category. The use of categories makes it easier for the ITF and professor to aggregate and organize the posts by assignment. Had
the students also used tags, the audience could have searched the content by topic or area of interest. In an assignment such as the low-stakes assignment crafted by Professor D, tagging the post by the article title or author’s name, or even keywords, would have enabled students to review their peers opinions on the same subject. Grouping posts together by topic also encourages commenting, a low-stakes assignment crafted by Professor D, tagging the post by content by topic or area of interest. In an assignment such as the assignment for this section of “Science and Technology in New website and to display research in a variety of modes. The final assignment for this section of “Science and Technology in New York City” specifically required a “digital artifact.” The ITF for this course posted a variety of options in terms of tools to use to create the artifact and offered to help students create these resources. All of the sites featured media of some type, but the media included was perhaps not as varied as the suggestions on the resources list provided by the ITF, which included: a documentary, a rap video, an animation, a play, a podcast, a podwalk, a cartoon, a graphic novel, or a Google Map overlay. Each of these suggestions came with examples and instructions (“Final Project Resources”). Two of the three final group projects contained student created videos and images, and one contained external videos.

None of the groups ventured to create some of the more inventive suggestions, such as a cartoon, rap video, or animation, most likely because these are not skills learned in the previous seminars. However, many of the Seminar 2 courses include lessons on making interactive maps in the form of podwalks or Google map overlays, yet none of the students in this class chose to incorporate either option for this project. This could be because making videos is perceived as easier, more familiar, or less time consuming, or it could have been a preference expressed by the instructor in class. It is also important to consider that these formats are intimidating and laborious even for advanced students and professionals in the field. Nevertheless, the uniformity in the use of media is remarkable, especially considering the sites created by these groups display variety in other ways, such as in the themes, color schemes, content layout, and other design choices.

Only one group site utilized categories and tags, and none of the sites had comments from the instructor or the community. This does not mean the projects failed to meet the requirements of the assignment or the expectations of the instructor: to accomplish the goal of conveying “everyday science” to the general public. However, in terms of maximizing the potential of the platform, these sites fall short.

**Analysis.** Comparing these two sections of Seminar 3, the science-based general education seminar, demonstrates that disciplinary standards have less of an influence on student writing than instructor expectation. The results show that all of the low stakes posts composed for Professor C were written in the extensive mode, while all of the low stakes posts composed for Professor D were written in the reflexive mode. Neither mode is privileged in this study, therefore these results do not indicate which assignment is inherently better pedagogically, but rather reveals what factors have the greatest impact on student writing. It is interesting to note that half of the low stakes posts in the science-based courses were to be composed in the reflexive mode, because this may signify the importance instructors place on informal, personal, exploratory writing across the disciplines. Similarly, in both sections of Seminar 3 all of the high stakes posts were composed in the extensive mode, which suggests that this type of analytical, research-driven writing is highly prized in the sciences.

While the mode of writing in somewhat consistent across courses coded for this study, the use of media is widely varied. Despite the fact that students know how to incorporate media and folksonomic elements into their posts, the singularly text-based compositions produced for the low stakes assignments for both sections of Seminar 3 coded for this study illustrate a disconnect between the digital literacy skills of the students and their willingness or ability to implement the skills unless specifically directed to do so. Therefore, if instructors want students to exercise these skills they need to make it explicitly clear that student can and should include media when appropriate to the assignment.

Even in the high stakes assignments that did specifically require original media and website design, the students did not experiment with new forms of content creation. One solution is to encourage students to experiment with multimodal composition in the low stakes assignments and then discuss the effectiveness of these attempts before embarking on the high stakes assignments. This requires a discussion of when and how to incorporate media in a way that enhances the written text, which is neither a simple task nor a skill that all instructors possess. Considering that media inclusion is relatively new in academic publications, it is reasonable to assume instructors need professional development regarding integrating and evaluating digital scholarship into their pedagogical work as well as their personal research.

**PEDAGOGICAL APPLICATIONS**

This section translates the results of this research into tangible, applicable suggestions. These are practices that can be implemented at any institution of higher education in any online writing program. Suggestions are meant to be applicable across any disciplinary field at any level of instruction.

- **Design assignments with specific requirements for media inclusion.** To foster multimedia inclusion, requirements should match the learning objectives and medium of the assignment. As this study demonstrates, students do not include media unless specifically instructed to do so in the formal assignment sheet. While media is not necessary for every assignment, when it is appropriate to use media for a rhetorical purpose, support and guidance should be provided to students in order to achieve this goal. This support could come from in-class workshops, demonstrations, web-based tutorials, and may be provided by the instructor, an educational technologist, or their peers.

- **Encourage students to transfer digital literacy practices learned through personal technology use, or from use in other classes, to their online writing assignments.** Give students the opportunity to demonstrate expertise with tools they are already familiar with and to teach others how to use these skills. Students also need to learn how to troubleshoot and find solutions for themselves if they need help. Sticking a balance between instructor-led and self-directed learning will depend on the student population, the level of technological fluency of the instructor, and support available from staff and administrators.
• Provide training for instructors in how and when to use the tools they wish to incorporate. One-time workshops are rarely effective when thoroughly implementing a new tool into a curriculum. Rather, close partnerships or learning communities involving faculty and staff should be formed to discuss both the pedagogical applications of the tool and the technological skills needed to implement the tool. With proper training, instructors could construct assignment sheets using media to model techniques for students (such as images, videos, GIFs, screencasts, etc.).

• Assess digital literacy as an ongoing practice. As this study demonstrates, online writing can and should involve low stakes assignments in which students can practice composing in various media. In these low stakes assignments students should be encouraged to take risks and fail without consequence. For high stakes assignments, the value placed on multimodal aspects should be weighed against the amount of time and level of support that was given to the students in order to create these materials.

• Contextualize digital literacy practices fostered in the classroom in applications outside the parameters of the assignment. For example, the inclusion of tags and/or categories in WordPress posts translates to using hashtags in social media, or keywords in databases, or search terms on search engines. Practicing and discussing how these elements function gives students a deeper understanding of information architecture across platforms. Similarly, the comments section on social media and news sites are often contested and volatile spaces abused by participants, and teaching students how to comment productively through course work could lead to more thoughtful, constructive participation online. In order to increase the use of folksonomic elements and commenting, instructors and educational technologists can model this practice by commenting on posts, and then require students to comment on a set number of posts as well.

• Include students in the process of designing online spaces. Basic instruction on web design and information architecture forms the foundation for advanced technological fluency. Furthermore, this shifts the position of the student from consumer to creator. Research shows that agency over and control within an online space supports responsible digital citizenship. For more research on digital citizenship see the work of Amy Wan.

• Adopt open access and open source platforms that allow the students to engage with the space at the level of coding. When students are able to see and manipulate the code that runs the site, they can use this space as a “sandbox” for developing programming skills. Learning the language of the web, and forming an understanding of how the web functions, is an essential digital literacy in the 21st century. Additionally, using open access tools ensures students will not be priced out of these platforms after graduation. For a more nuanced explanation see the work of Karl Stolley and Jim Groom.

Instructors need support from administrators in order to successfully design courses that encourage students to develop a digital literacy practice. New platforms and tools need to be purchased after pedagogical goals are established and discussed amongst instructors, educational technologists, and administrators. For examples on how to select the best tools for your institution, see Issue 10 of the Journal of Interactive Technology and Pedagogy on ePortfolios. A good rule to follow is always opt for a flexible, open platform to allow for unanticipated iterations and future applications.

**CONCLUSIONS**

The evidence suggests instructors need to scaffold digital literacy practices into assignments with careful attention to the rhetoric they use and intentional instruction in matching purpose and method. Quantitatively, the humanities sites contained more reflexive writing: 18 of the 24 posts coded for the humanities-based Seminar 1 sites were composed in the reflexive mode, compared to 6 of 24 in the science-based Seminar 3 sites. This conveys a disciplinary divide, especially in regard to high stakes assignments.

As expected, the “Arts in New York City” seminars produced experiential, personal writing about the immersion experiences featured in this course, yet, contrary to expectation, this reflexive tone continued from the low stakes posts through the high stakes projects. In the science-based courses, all of the students composed in the extensive mode for their high stakes assignments. The persistent use of the reflexive tone throughout Seminar 1 indicates that students feel comfortable writing in an informal, personal style in their humanities-based classes, but do not feel this is appropriate in their science-based courses. Even in cases where the instructor encourages informal writing in the science-based seminars, the students produced extensive writing. The unanswered question is where the impetus for formal writing comes from for students composing for science courses.

The subset of data collected from the Macaulay ePortfolio archive provides evidence of the shift as compositions produced in science classes combine the reflexive mode of writing with the data driven methods introduced at the level of general education. This may be a fundamental difference between the two academic disciplines and the expectations of practitioners in these fields: generally speaking, the humanities value personal experience and opinion-based arguments, whereas the sciences value data. However, this distinction is shifting both with the rise of the digital humanities, which introduces a focus on data to the humanities, and with the increased emphasis on writing across the curriculum, which encourages instructors to incorporate more low stakes assignments into science-based courses. Both of these changes affect how instructors teach and design writing assignments across the disciplines. With data collected from more sites coded in this same manner, this difference could provide evidence that writing expectations vary greatly across the disciplines, or if this study was replicated over several years, it could indicate if the trend is shifting toward the inclusion of reflexive writing in the sciences, or extensive writing in the humanities.

Also, further questioning through surveys or interviews with the students could determine if these tendencies have been conditioned in students over time. From these preliminary results it appears that the tendency toward extensive writing is the result of conditioning, especially for this population of honors students who have displayed the ability to follow directions and earn high academic marks in order to be admitted to Macaulay, an elite program. The transition to the digital space does not break that conditioning: for example, the multimedia projects produced in the humanities seminars were opinion-based and argumentative, whereas the science-based videos were informative and data-driven. Therefore, if instructors wish to support informal, reflexive writing in the sciences, such a
desire must be explicit in the written and verbal instructions and should be practiced throughout the course.

The same is true for the inclusion of multimedia and folksonomic elements in digital writing: if digital literacy skills are emphasized as an objective of a program, then these elements must be explicitly required and practiced across the curriculum. The results of this study show that students are more likely to incorporate multimedia in humanities-based courses than in science-based courses. The “Arts in New York City” course produced more media-rich posts than the “Science and Technology in New York City” courses, presumably due to the emphasis on cultural immersion experiences. Yet, even with a course designed to encourage students to grapple with media, the majority of students only included multimodal elements in their posts when explicitly directed to do so. This remains true in science classes that include field-based learning where students were encouraged to take photographs and videos. Students did not include these multimodal elements in posts to the course site unless explicitly asked to do so by the instructor. In both humanities and science courses, the use of multimedia increases when instructors make it a requirement for high stakes assignments. This is logically due to the students’ desire to receive a high grade by meeting the expectations set forth by the instructor in the assignment prompt.

It is not clear from this study if students possess an understanding of how folksonomic elements work or if they have the ability to implement categories and tags correctly. This is an area of the Macaulay curriculum that could be strengthened across all courses. Although categories are used to organize information on a few of the course sites, it is only carried through to one of the student sites, which indicates that this was a technical consideration implemented by the ITF and instructor and executed by the students as requested. The minimal use of categories to organize student sites does not provide evidence that the students understand why they are using categories or if they could implement this feature without the guidance of an expert. The same is true with the use of commenting and tagging: if the ITFs are suggesting the use of tags or comments, the students are not executing these suggestions. In cases where the instructor utilizes the commenting feature to respond to student writing, the students do not follow this model and add to the conversation. Commenting is such a vital part of the digital communication economy and one that students are familiar with before participating in the honors seminars because of the widespread use of social media. Developing the skill in an academic environment is a missed opportunity to cultivate active digital citizens.

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NOTES
*All of the blogs sites and posts included in this article are public and posted under a Creative Commons license.

** For more information, such as the full list of survey questions, the consent forms, and the coding database, please contact the author at Amanda Licastro at alicastro@stevenson.edu.
Localizing Complex Scientific Communication: A SWOT Analysis and Multi-sectoral Approach of Communicating Climate Change

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ABSTRACT
This paper argues that a SWOT analysis (Dyson, 2004; Helms & Nixon, 2010; Holtzhausen & Zerfass, 2015; Houben, Lenie, & Vanhoof, 1999; Noble & Bestley, 2011) and a multi-sectorial approach (Okware, Opio, Musingizi, & Waibele, 2001; The World Bank, 2000; Uganda AIDS Commission & UNAIDS, 2000) to strategic communication can provide communication designers with a conceptual framework for localizing climate prediction and risk management information. The overarching idea is to use a multi-way communication model, such as suggested by McQuail (1987), to downscale climate data in a way that better addresses the communication expectations of the public in different locales. Such approaches can reduce barriers that often inhibit the international transfer of technical and scientific data for public consumption in different global contexts. To examine these issues, this paper uses a SWOT analysis for considering strategic communication planning in international settings. In so doing, the paper examines the work of the Intergovernmental Authority on Development (IGARD) Climate Predictions and Applications Centre (ICPAC) in its efforts to respond to climate extremes and ensure disaster risk management in the Greater Horn of Africa.

Categories and Subject Descriptors
H.0 Information Systems: General

General Terms
Documentation, Design

Keywords
climate change, strategic communication, SWOT analysis, multi-sectoral approach

INTRODUCTION
Researchers have increasingly investigated visual representations of climate change information (see, for example, Manzo, 2010; DiFrancesco, & Young, 2011). Among these studies, several scholars agree that addressing the visual aspects of scientific communication is central to understanding how climate change information might be framed, mediated, perceived, and designed for international and local audiences (Anderson, 2009; Doyle, 2011; Sheppard, 2012; Iqbal, 2013; Thompson, Devis, & Mullen, 2013; O’Neill, & Smith, 2014; Wozniak, Luck, & Wessler, 2014). Within this context, communication design and technical communication researchers have contributed to these discussions by investigating ways of visually depicting information on risk, science, and climate change (Wickliff, 2000; Dobrin & Morey, 2009; Kain & Covi, 2013).

Given this increased interest, Cagle and Tillery (2015) argue that “opportunities remain for [technical communicators] to leverage… expertise in visual appeals,” as well as rhetorical approaches to digitally communicating climate change (p. 159). Following ideas noted by Grabill and Simmons (1998), Cagle and Tillery suggest that technical communicators can “play a role as advocates in wicked problems like climate change,” as well as “in the process of constructing and communicating risk” (p. 160). Related research can reveal important strategies for producing and disseminating effective materials for communicating climate predictions and related risks in different international contexts.

Despite the relevance of this research, the contextual environment wherein visual artifacts of climate change are produced and distributed has been considered a “scale of systems, and not simply as cognitive (framing) processes or the construction of meaning in individual subjects” (Cox, 2010, p. 130). Hence, there is a need to develop strategic approaches for communication design in complex, organizational settings and for audiences from different cultures (Hayhoe, 2012). Within this context, this entry seeks to

• Extend recent communication design research on climate change information
• Demonstrate how Strength Weaknesses Opportunities and Threats (SWOT) analysis and a multi-sectoral approach can be used for understanding contextual factors of localizing and downscaling climate change communication

By using the Intergovernmental Agency for Regional Development (IGARD) Climate Prediction and Applications Center (ICPAC) as a case study, this entry presents the results of a situation and audience analysis of localizing climate prediction in a complex, socio-technical system.

In examining these issues, the authors advocate for the development of a multimodal, multi-sectoral strategy (O’Neill, & Smith, 2014) for localizing scientific information to meet the information-seeking needs of different groups. To do so, the authors use SWOT analysis to review the complex internal and external environment within which ICPAC operates so as to design an effective strategic communication plan, as suggested by a number of scholars (Dyson, 2004; Helms & Nixon, 2010; Holtzhausen & Zerfass, 2015; Houben, Lenie, & Vanhoof, 1999; Noble & Bestley, 2011). In so doing, the authors also examine how a multi-sectoral approach can serve as an effective mechanism for localizing complex information for public consumption in different cultures.

**CHALLENGES AND OPPORTUNITIES FOR LOCALIZING CLIMATE CHANGE INFORMATION**

Historically, communication design research on internationalization and localization has focused on adapting information for end users in specific cultural contexts. Within this context, a number of scholars have suggested conceptual frameworks (e.g., the use of metaphors or the creation of personas) for understanding how messages and products might be designed for cross-cultural audiences in local and international settings (de Castro Salgado, de Souza, & Leitao, 2011; Getto & St.Amant, 2014). Additionally, researchers in communication design have suggested using conceptual frameworks, such as activity theory (Sun, 2007), to develop effective communication by understanding how artifacts function in larger systems of communication activity (Sun, 2009).

While research on cultural usability abounds, research based on understanding the “series of complex and constantly evolving cultural discourses” has been acknowledged as most critical for climate change communication (Hulme, 2007). The studies cited here indicate that internationalization and localization require strategic planning prior to designing audience-centered messages. Researchers working in this area have, in turn, identified three major challenges that affect communication strategies for localizing climate change information:

- **Challenge 1**: Natural and social systems: By “natural,” we mean the “natural environment” while “social systems” refers to societal organizations such as political or government and non-governmental organizations.

- **Challenge 2**: One-way communication model of transferring information: Here, “one-way communication” means a message comes from the sender to receiver, and the sender receives no feedback from that receiver – this is as indicated in the Sender-Receiver (S-R) model sometimes referred to as the hypodermic needle theory (McQuail, 1987).

- **Challenge 3**: Probability: By “probability,” we mean the fact that there is always a chance of error in climate predictions

Individuals working in communication design can mitigate the aforementioned challenges of climate change communication by:

- Facilitating communicative interaction through activities such as dialogue between scientists and the intended audience.
- Promoting a participatory localization process by engaging in practices such as research that includes the intended audience and forums that promote dialogue between the scientists and the local citizens.
- Contextualizing the contexts of uncertain environments.

Realizing these approaches requires communication designers to engage in more effective and more informed practices related to sharing information about risk and climate change in greater international contexts.

**Facilitating Communicative Interaction within Complex Socio-technical Systems:**

Climate change communication environments are non-linear, dynamic processes composed of natural and social systems (Welsh, 2010). This complex, socio-technical environment creates barriers for localizing and downscaling scientific communication on climate change for specific audiences, such as scientists, policymakers, and the public. According to Birkman and von Teichman (2010), climate predictions and applications are based on global or entire country or regional models. To address such factors, scientists have adopted statistical downscaling to translate global projections to local and regional contexts; however, “this operation [has added] additional uncertainty to the results” (Markandya, Galarraga, & Murieta, 2014, p. 7).

Some researchers have noted that downscaling and localizing climate change communication involves more than statistical translation (Markandya, Galarraga, & Murieta, 2014). In fact, it is a complex, socio-technical process that creates significant challenges for climate researchers (Krauss, 2009). Moreover, critics such as Spence and Pidgeon (2010) have argued for the need to localize the climate outlook to the community level. Other researchers in the area of risk and climate change have further argued that the impact of climate extremes may not always be downscaled to the local communities (Birkman & von Teichman, 2010). As a result, a number of scholars have suggested adopting communication strategies that use more dialogic models of climate change communication strategies (Carvalho, 2008; Moser, 2010). The idea is that such strategies effectively enhance audience-tailored messages for climate change communication (Nerlich, Kotevko, & Brown, 2010). Communication design research can, in turn, enhance the possibilities for localizing climate change information by facilitating communicative interaction “in the socio-technical networks where communication does work” (Swarts, 2012, p. 13).

**Promoting Participatory Localization over One-Way Models of Transferring Information:**

Some researchers indicate that one-way approaches to information delivery create barriers for localizing and downscaling climate change information and risk prediction (Patt & Desai, 2005; Spence & Pidgeon, 2010). Such one-way approaches can include meteorologists disseminating climate prediction information to the public through mass media without any possibility of feedback.
from the public. For instance, the above mentioned scholars argue that climate scientists and prediction experts use a one-way communication model to transfer climate information and predictions to end users. Such users include farmers, fishermen, and traders—all audiences affected by such situations but who also do not understand the complex climate scientific data.

Additionally, there is often little dialogue between the climate scientists and the aforementioned most critical end users. An illustration of this situation was given by Vogel and O’Brien in their 2006 article “Who Can Eat Information?” In this entry, the authors stipulate that during the 1997-1998 climate outlook forum of the Southern African Development Community (SADC), there was a mechanism for interaction and discussion. Because of the one-way communication model used by the climate scientists involved in the undertaking, the effort did not yield the intended goals. In this case, the climate scientists failed to consider the end users of the information they provided; thus, that information went, largely, unused by the intended audience.

One important way to address such problems is to consider climate and risk communication from the perspective of the audience with which one wishes to share information. In essence, user-centered design opens possibilities for designing climate change information by engaging participants in the internationalization and localization process (Verweij, Marinova, & Lokersm, 2014). And this connection has not been lost on those working in the communication fields. Communication design researchers, for example, have recently called for participatory approaches for localizing information (Agboka, 2013). In so doing, they note that end-users are too often viewed as onlookers in user-centered design rather than putting end-users at the center of the design process.

Further complicating this problematic situation is the concept of probability. In essence, probability creates a major obstacle for localizing climate change information because chances of error mean predictions might not actually happen. For instance, it may be predicted that the rainy season will start at the beginning of March. If this does not happen/if the season starts later, this delay could confuse farmers who rely on this information for scheduling the planting of crops. (As such, this situation could result in less crop production and hence less income for farmers for that season.) Thus probability creates major challenges related to planning many climate-related communication solutions in advance.

**Conceptualizing the Contexts of Uncertain Communication Environments:**

Climate prediction, applications, and disaster risk reduction are fundamentally complex and involve uncertainty (Markandya, Galarraga, & Murieta, 2014; Moser, 2010; Patt & Desai, 2005; Spence & Pidgeon, 2010). Additionally, as Vogel and O’Brien (2006) suggest, climate predictions take place in an uncertain environment where science cannot make perfect predictions and where there is always a chance of error. Vogel and O’Brien go on to note that this complex environment is often not well understood by climate scientists themselves. Thus, while advances in scientific research have led to improved climate science, communicating climate change has suffered from uncertainty “because it is insufficiently understood and never entirely predictable” (Moser, 2010, p. 35).

The first step in rectifying this situation might be getting both climate scientists and end users to comprehend and accept this fact. Hence, there is dire need to better understand the complex environment within which climate prediction, applications, disaster risk reduction operates as a system. In this realm, communication designers are well poised to make important contributions.

Communication design researchers have created an array of resources for contextualizing information—particularly complex information—such as that associated with discussing climate change. Such resources can be invaluable when attempting to address complex and difficult-to-predict situations such as those associated with climate change. Applying such resources effectively in international contexts, however, requires us to reconsider existing approaches to communication design. Such reconsideration is needed, for the contexts associated with adapting information for different international audiences are often not the same. Thus, information needs to be contextualized according to various user expectations couched within the additional complexities of cultural and organizational settings (St. Amant, 2015).

Communication in such environments, moreover, is not a one-way conveyance of information. Rather, it is a continual process of give and take. As Cagle and Tillery (2015) explain, the challenges of this situation mean communication designers might “lose a sense of how global topics such as climate change are shaped by national events and discourses, including political shifts, institutional cultures, and mass media coverage” (p. 159). Thus, opportunities exist for communication designers to investigate how they might adapt climate change information to share it effectively with audiences in different international settings.

The aforementioned challenges and opportunities illustrate strategic approaches for localization that occur at the design planning stage. As Aaron Marcus (2001) suggests, researchers should investigate the “challenges or opportunities for globalization,” as well as “establish objectives and tactics” (p. 53). To address such factors, Marcus provides general guidelines for globalizing information. These include “determin[ing] the appropriate media for the appropriate target user categories” (p. 54). The challenge in these situations becomes finding different frameworks, approaches, and practices for realizing such factors.

One mechanism for addressing this situation is through the use of a SWOT analysis and a multi-sectoral perspective. In combination, these approaches can form an approach that communication designers can use to understand and address complex international interactions among multiple actors. As such, SWOT analysis and the multi-sectoral perspective can help communication designers to develop effective strategies for participation in the localization process and in contextualizing internal (strengths and weaknesses of the organization) and external (threats and opportunities in the environment) factors affecting internationalization and localization strategies. The next section outlines the research context and questions that are addressed through SWOT analysis. Following the results of the SWOT analysis, the researchers demonstrate how the multi-sectoral perspective can further help communication designers to strategically develop climate information for multiple audiences.

**RESEARCH CONTEXT AND QUESTIONS**

A number of scholars have suggested climatic conditions involving too little or too much rainfall has left sub-Saharan Africa prone to chronic food insecurity and famine (Vogel & O’Brien, 2006). Moreover, extreme variations in climate can lead to poor agricultural
production and economic stress. Communicating the complexities of climate change, prediction, applications, and disaster risk reduction information in relation to such contexts has presented significant challenges to a number of organizations. These include ICPAC, country meteorology officers, and governments in the sub-region of the Greater Horn of Africa. ICPAC’s mission is to provide residents of the region with early warning climate information that can allow for timely decision-making. It is also responsible for supporting specific sector applications designed to enable the region to cope with various risks associated with extreme climate variability.

The idea, in this case, is to facilitate the kinds of change associated with poverty alleviation, environmental management, and sustainable development in member countries (ICPAC, n. d.). During the 36th Climate Outlook Forum of the Greater Horn of Africa (GHACOF 36), the first author of this entry was invited to deliver a presentation on building mass communication resilience to climate extremes. A majority of the participants at both GHACOF 36 and later GHACOF 37 agreed that while the science of climate prediction by climate scientists has made tremendous progress, there is dire need to communicate the complicated science information to all stakeholders and end users in the sub-region. During GHACOF 37, for example, a representative from the World Meteorological Organization (WMO) recommended that there is need to take the issue of communication seriously.

In response to the various ideas and contexts noted in the earlier sections of this entry, the researchers sought to address the following research questions in relation to expanding communication design to more effectively share complex, climate information in global contexts:

RQ1: What communication design aspects constitute strengths and contribute to effective communication design practices about climate in international contexts?

RQ2: What communication design aspects constitute weaknesses and limit the effectiveness of communication materials designed to convey climate-related information in international contexts?

RQ3: What opportunities are there for enhancing or improving communication practices associated with the external environment surrounding organizations dealing with climate-related issues in international contexts?

RQ4: What are the greatest threats to effectively communicating climate-related information by organizations in international contexts?

Using these questions as a guide, the authors sought to investigate these issues via a research process involving a combination of the methods noted earlier in this entry. Whereas SWOT analysis was used to analyze the internal and external factors of ICPAC’s strengths, weaknesses, opportunities, and threats, the multi-sectoral perspective was used to determine how communication designers might develop audience-centered messages and campaigns.

METHODOLOGY

A number of scholars have suggested that the SWOT analysis approach is a central component in strategic planning for organizations in business management (Helms & Nixon, 2010; Houben, Lenie, & Vanhoof, 1999). Recently, scholars in the field of communication design have noted that the SWOT analysis approach also has a great deal to offer researchers and practitioners in the field (Karjaluoto, 2014; Noble & Bestley, 2011). For instance, the SWOT analysis approach is deemed as the first step in the research phase in the public relations campaign planning process (Houben, Lenie, & Vanhoof, 1999). The authors further explain that the SWOT analysis process represents a natural start to developing a strategic plan, for such an analysis helps individuals to identify the complex and dynamic environment within which any organization or business operates.

Advocates of this method further argue that the use of SWOT analysis provides a more complete understanding of the variables that may help or hinder an organization in reaching its objectives (Helms & Nixon, 2010; Houben, Lenie, & Vanhoof, 1999). Others note that the SWOT analysis approach enables researchers to analyze the environmental strengths, weaknesses, opportunities, and threats that affect the functioning of any organization (Dyson, 2004). These scholars also argue that a key benefit of this approach is that it identifies a range of organizational strengths and weaknesses relating to key internal factors such as human resources and products. Opportunities and threats identified via such an analysis, however, are connected to external factors (e.g., such as politics, policy, the economy, and organizations in the environment). Thus the approach has its benefits (enhanced understanding of internal factors) and its limitations (minimal understanding of external factors). It does, however, provide communication designers with a mechanism for understanding the internal factors that can affect the communication of climate-related information within a given organization.

Advocates of this method explain that it involves two steps (Chang & Huang, 2006; Seker & Ozgurler, 2012). The first step analyses the internal strengths and weaknesses of the organization that may impact its strategic planning. The second step analyzes the opportunities and threats in the external environment that may impact the success of the strategic planning of the organization. These two steps were used to understand the internal strengths and weaknesses of ICPAC and the external opportunities and threats that impact the designing of effective strategies for communicating complex climate science information to various stakeholders. The SWOT analysis uses an informal process to collect and analyze data unlike other research methods such as focus groups, surveys, in-depth interviews, and content analysis, which use a more formal process. In the following sections, the researchers explain the procedures for collecting data and steps for analyzing archival material.

Data Collection

The overall data collection process began when the first author conducted informal research at ICPAC Headquarters in Nairobi, Kenya between May 13 and June 20, 2014. The purpose of these initial activities was to identify materials for analysis. This process involved less structured data collection and similarly less-structured analysis of that data (Simmons, 1983). During this data collection process, the first author conducted archival research at ICPAC headquarters and assembled the following materials for analysis:

- Ten annual reports ICPAC published between 2000-2010 (each year ICPAC publishes an annual report that documents the activities of the organization, the goals for that year, which of the goals for that year the organization accomplished and which it did not). These reports were selected for analysis because they provided organization-specific data including the
organization’s goals, objectives, and activities during a given year, the organization’s achievements for a given year, and the challenges it encountered during that year.

- Six quarterly newsletters published by ICPAC in 2012-2014 (ICPAC publishes a quarterly newsletter it distributes to meteorologists, agriculture officers, forest officers, fisheries officers, policy makers, and the general public in the 10 countries that cover the IGAD region – Burundi, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, South Sudan, Sudan, Tanzania, and Uganda.) These newsletters were selected for analysis because they could provide additional information to supplement the data found in the annual IACP reports.

- Charts ICPAC meteorologists produced to display at GHACOF in 2012-2014 (meteorologists showed these charts to display the predicted and actual climate conditions in the Greater Horn of Africa for this two-year time frame). The charts were selected for analysis because they provided examples of the climate predictions ICPAC makes for and shares at each of the climate outlook forums it holds every year.

These particular items were selected because they represented materials used to share climate information across various sectors within and outside ICPAC. As such, these materials represented the kinds of multi-sectoral items communication designers should collect for analysis in order to identify factors that could affect the presentation of complex information in various international contexts. Once the materials for review were assembled, the researchers conducted a SWOT analysis of these items to identify different trends related to sharing information in international contexts.

For this research, SWOT analysis was used to analyze the external and internal environment within which ICPAC as an organization operates. By doing so, the researchers were able to identify the strengths, weaknesses, opportunities, and threats that lend themselves palatable to localizing complex climate scientific information. In turn this enabled the researchers to suggest ways that can be used by designers of complex climate science information.

In the next section, we outline the SWOT analysis.

**Analysis**

Each of the annual reports, newsletters, and charts were read by the first author and notes were taken to address the strengths, weaknesses, opportunities, and threats. In the SWOT analysis process, the category of “Strengths” refers to the advantages that ICPAC has as an organization that produces climate change predictions and applications data. For this analysis, the researchers reviewed the documents for factors such as the scientific technical components that make up ICPAC as a system as indicating “strengths.” From this analysis, the researchers were able to collect data on the scientific expertise that ICPAC possesses for producing climate prediction and applications data.

In the SWOT analysis process, the category of “Weaknesses” refers to structural components within ICPAC such as differentiated units and expertise – meteorology and meteorologists, hydrology and hydrologists, agriculture and agriculturalists, health and health officers – which leads to lack of effective communication and information flow of the complex scientific products and applications by these units and experts. For this analysis, the researchers reviewed the documents for factors such as the bottlenecks in the communication of information, products, and applications between the various units and experts as indicating “weaknesses.” From this analysis, the researchers were able to collect data on how the information, products, and applications were communicated among the units and experts at ICPAC.

In the SWOT analysis process, the category of “Opportunities” refers to the unique role that ICPAC can play among the various sectors – meteorology, agriculture, fisheries, general public – in the 10 countries under IGARD. For this analysis, the researchers reviewed the documents for factors such as the contacts and connections between ICPAC and the various sectors in the 10 countries under IGARD as indicating “opportunities.” From this analysis, the researchers were able to collect data on what extent ICPAC communicated to the various sectors in the 10 countries under IGARD.

In the SWOT analysis process, the category of “Threats” refers to the challenges that the differentiated audiences and stakeholders that ICPAC’S complex information, products, and applications are aimed at serving. For this analysis, the researchers reviewed the documents for factors such as the differentiated environment within which ICPAC operates and the complex nature of the scientific climate information, products, and applications as indicating “threats.” From this analysis, the researchers were able to collect data on the final recipients of the complex scientific information, products, applications were communicated by ICPAC.

Through this approach, the researchers noted a number of trends that have important implications for communication designers who wish to share climate change (and related risk) information effectively across sectors and in international contexts.

**RESULTS**

**Internal Factors of Strengths and Weaknesses**

**Strengths:** The results of the SWOT analysis indicate that ICPAC has three sub-systems—water resources, agriculture, and disaster risk management. The strengths of ICPAC lie in the human resources in form of experts that these three sub-systems possess. These experts include meteorologists, hydrologists, and agriculturalists who are well-trained and are capable of executing the objectives of ICPAC and capacity building within the sub-region. These strengths can be seen in design factors such as the complex data sets, charts, and presentations that the experts at ICPAC produce for display at the various forums for downscaling of the climate outlook every year.

In addition, the results of the SWOT analysis show that ICPAC has the capacity to acquire new climate data including remotely sensed data; develop and archive national and regional climate databases including calibration of satellite derived climate records; process and develop data and basic climatological statistics required for baseline risk scenarios, detection and attribution of climate change, processes, studies and other applications; monitor, predict, and provide early warning information of the space-time evolutions of weather and climate extremes over the sub-region; downscale and apply climate information and prediction services required by the individual climate sensitive sectors, including integration of indigenous knowledge. As mentioned before, these strengths accrue from the unique expertise that the various units that make up ICPAC as a professional organization. These experts are well-trained and are knowledgeable in their various areas. Furthermore, all the various units have international experts from all over world including Europe and the United States who supplement the experts from the 10 countries in the sub-region.
Weaknesses: The results of the SWOT analysis reveal one major weakness within ICPAC. It was surprising that there is lack of effective communication of the complex climate information, products, and applications between the experts in the three subsystems of ICPAC. It is conventional wisdom that there would be information flow and feedback between ICPAC’s subsystems. However, the results show that this is not the case. As mentioned above there are meteorologists, hydrologists, and agriculturalists at ICPAC. These professions have different goals and hence their complex scientific climate information, products, and applications are not shared until the sub-regional forums for downscaling the seasonal climate outlook. This is because the three sub-systems do not conduct meetings to discuss their research and findings on climate information, products, and applications. Hence, the various experts remain in their silos and do not communicate or discuss the complex climate information, products, and applications with those outside their profession before the sub-regional forums for downscaling the seasonal climate outlook. Yet, in order for the three sub-systems to function properly there must be constant flow of information and feedback between them. This is a major weakness and has practical and theoretical implications for designing effective strategies for communicating complex science information in any field.

The results of ICPAC’s internal aspects reveal that designers must address the multiple systems and potential lack of effective communication wherein visual artifacts and messages about climate change are developed. Though designing complex scientific data for the public stems from processes of downscaling and localizing climate change information, the experts in ICPAC’s sub-systems do not share information, products, and applications throughout the process that leads to adapting communication for local audiences. One way to address the internal factors is using systems theory as a guide for designing climate change communication.

According to systems theory, organizations are systems made up of interdependent parts or subsystems (Bertalanffy, 1968). The theory further stipulates that some organizations are open while others are closed. In open systems, there is information flow and feedback among the different subsystems as well within the environment in which the organization operates (Kast & Rosenzweig, 1972; Katz & Khan, 1966; Zald & Scott, 2010). This process of interaction includes internal and external environments that encompass natural and social systems and as interdependent sectors. For example, North Carolina State University (NC State University) as an organization is an open system which is composed of different colleges and departments – sub-systems - and functions within the larger environment of the University of North Carolina system. There is interaction between NC State University and other universities in the University of North Carolina system. There is also interaction between the subsystems of NC State University. Closed systems, by contrast, restrict feedback between the environment and the system nor do they allow for interaction among the different component parts—or sub-systems—within the overall system. North Korea is a perfect example of a closed system. There is little interaction between this country and other countries such that little is known about it.

Systems theory can provide insights into these internal strengths and weaknesses of information exchange (or lack thereof) in relation to the organizations at work in such contexts. As such, it can serve as a valuable mechanism which communication designers can use to understand – and address – the complex context in which climate-related information is often shared and exchanged.

External Factors

Opportunities:
The results of the SWOT analysis further indicate that ICPAC has varied external audiences: (1) country climate scientists and meteorological officers, (2) sectors officers, (3) media, (4) politicians, policy makers, and government officials, and (5) end users. These varied audiences if identified properly, offer opportunities to design tailored climate science information messages with particular emphasis for each of the audiences instead of a blanket message. While communication campaign scholars have suggested the use of multiple channels to reach a bigger percentage of diverse target groups (Kiwanuka-Tondo & Snyder, 2002; Kiwanuka-Tondo, Hamilton, & Jameson, 2009), there is a need for segmenting the audience and identifying appropriate channels to reach differentiated audiences (Backer, Rogers, & Sopory, 1992; Backer & Rogers, 1994; Hornik, 1988, 1989; Kiwanuka-Tondo, Hamilton, & Jameson, 2009; Kiwanuka-Tondo & Snyder, 2002; Woods, Davis, & Westover, 1991). Communication designers could use a multi-sectoral approach to develop a number of strategies for effectively communicating complex climate prediction, applications, and risk reduction information for the aforementioned audiences.

It was surprising that during the Greater Horn of Africa Forums in which ICPAC presents the climate seasonal outlook a number of professionals from other sectors – agriculture, fisheries, forestry, and the media – from the host country are invited in addition to meteorologists and hydrologists. This forum offers a unique opportunity for ICPAC to have a dialogue with these professionals who can help to disseminate the seasonal climate outlook to their audiences more effectively. This is important since these professionals are the ones who are in contact with the end users – farmers, fishermen, and the general public - of the complex climate information, products, and applications from ICPAC. Furthermore, it was found that there is information flow and feedback between ICPAC and the external environment within which it operates. For instance, it was found that there is information flow and feedback between ICPAC, IGARD, the 10 governments within the Greater Horn of Africa, and the World Meteorology Organization (WMO). This also offers ICPAC a unique opportunity in terms of funding and sharing expertise, experiences, and information in communicating complex scientific data.

Threats:
The results indicate that communication designers face several threats for effectively developing strategic communication plan for ICPAC. First, the organization faces challenges of having three internal differentiated sub-systems and the need for dialogic communication. Second, ICPAC exists in a complex environment with various other organizations that impact it in terms of information flow and feedback as well as public policies. For instance, the policies and politics of the 10 governments within the Greater Horn of Africa, WMO, and the United Nations Environmental Program (UNEP) affect IGARD operations, funding, and functions. Moreover, there are other intergovernmental organizations such as the World Food Program (WFP) and the Food Agricultural Organization (FAO) whose policies and operations are affected and affect climate information, products, and applications. This presents a major challenge since ICPAC has to act in concert with these important organizations let alone compete with them for funding. Third, ICPAC has the challenge of coming up with an effective strategy which addresses the challenge of communicating complex climate information, products, and applications between...
both internal and external systems in the environment within which it operates. To this end, the issue of climate extremes, prediction, applications, disaster risk reduction should be conceptualized in a holistic way that involves all pertinent sectors – public and private. At the same time ICPAC faces threats such as the political, social, economic, cultural environment within which it operates. For instance, political and economic instability in any country in the sub-region can lead to less financial resources available or support for its operations. Similarly the diverse nature of the stakeholders of ICPAC including meteorologists, agriculture and fisheries officers, politicians, media, and farmers makes the delivery of its products an immense challenge.

Communication designers have long considered the importance of audience-centered messages and information. Despite this understanding for adapting information for specific audiences, ICPAC’s opportunities and threats reveal that audience design must be considered in terms of an organization’s audiences. Though localizing complex scientific information about climate change for the public is important, climate change information flows through multiple sub-systems and sectors. Therefore, design strategies must also increase capacities for participation among these audiences.

In most cases, the central factor to success is for communication designers to conceptualize a central topic, the related audiences, and the plan for communicating information in a holistic way to that audience. Such a plan, however, generally involves all pertinent sectors – public and private (Arnell et al., 2014; GFDRR, 2014; Holman et al., 2005a, 2005b; Holman, 2006; Kemfert, 2005; Miles et al., 2010). Thus, when it comes to conveying risk information relating to climate issues, such an approach encourages communication designers to think in terms of conveying ideas across these sectors.

In the next sections of this entry, we demonstrate how communication designers might seize the opportunity to use an organization’s strengths, weaknesses, opportunities, and threats in order to develop a communication strategy for climate science messages.

**DISCUSSION**

As this study indicated, analyzing the strengths, weakness, opportunities, and threats provides these entities with effective strategies for localizing climate change information for various sectors in an international context. Though organizations have used strategic communication campaigns to address the complexity of climate change communication, including framed perspectives and the development of audience-centered messages (Anderson, 2009; Igna, 2013; Thompson, Devis, & Mullen, 2013), this study demonstrated that designing a communication strategy also involves “purposeful communication activities” between different institutions and actors, including strategies to advance an organization’s mission (Hallahan, Holzhause, van Betteke, Verčič, & Srirameshe, 2007). As Hallahan (2004) suggested, organizations commonly include six particular specialties, including management communication, marketing communication, public relations, technical communication, political communication, and information/social marketing campaigns. These entities may be involved in the strategic steps of campaign development, including situational analysis, audience segmentation, defining the goals of the campaign, developing a campaign strategy, implementing the campaign, and evaluating the effectiveness of the campaign strategy (Rossmann, 2015). Hence, for any strategy to succeed, it is crucial that the developers of the plan identify the various audiences with which they wish to share information. We suggest that ICPAC adopts the multi-sectoral approach for the effective communication of complex scientific climate information, products, and applications.

The multi-sectoral approach was first introduced by the Uganda National AIDS Control Program (UNACP) in its response to HIV/AIDS in 1992 (Okware, Opio, Musingizi, & Waibale, 2001; The World Bank, 2000; Uganda AIDS Commission and UNAIDS, 2000). The idea was to approach HIV/AIDS not simply as a health issue, but instead as a complex topic involving multiple sectors – public and private. Many other countries in Africa, in turn, have adopted this approach for responding to the HIV/AIDS epidemic. On particular benefit is that this approach can be expanded to address a range of complex topics and situations affecting a greater, international population. In the case of ICPAC, communication designers can use the multi-sectoral perspective to further identify strategies for multiple audiences.

In the following paragraphs, we deal with each audience that is pertinent to ICPAC and recommend strategies to enhance effective communication of complex scientific climate information, products, and applications. In so doing, we identify three variables communication designers must address when creating plans for sharing complex information with diverse audiences – particularly diverse audiences in global contexts. These variables are:

- **Demographic variables**: These include factors such as, age, sex, and level of formal education
- **Psychographic variables**: These include values, beliefs, and lifestyles
- **Technographic variables**: These are the different types of technologies people use to get information (e.g., Instagram, Facebook, Twitter, blogs, and e-mail)

By understanding and accounting for these, communication designers can create more effective messages for complex and diverse international audiences.

**Climate scientists and country meteorological officers**:

To address this audience we shall begin with the demographic variables specifically educational level. This audience is made up of highly educated men and women no matter what their age. This audience’s level of understanding of the climate science information is advanced and they are on the same page with producers of climate prediction, applications, and disaster risk reduction data at ICPAC. Hence the messages to this audience can be designed in more complex scientific terms. Furthermore, since this audience is highly educated, we recommend messages such as feature articles in newsletters explaining the scientific data from the climate prediction, applications, and risk reduction information. In terms of technographic variables, this audience has access to the Internet, laptops, and desktops and has the technical skills to surf the internet. Therefore, this audience can be reached using social media – twitter, blogs, Facebook, and Instagram. The advantage of this strategy is that it allows instant flow of information and feedback if it is managed properly. A listserv can be established with all e-mail addresses of this audience. In sum, this audience presents ICPAC with a unique opportunity to effectively communicate to them the complex climate information, products, and applications since they are more likely to understand scientific data.
Sectors officers – agriculture, water resources, disaster management, energy, forestry, urban development, health, and fisheries:

Regarding demographic variables, the most important characteristic of this audience is educational level. The results of the SWOT analysis indicate that sector officers are highly educated men and women of all ages even though they are not necessarily conversant with complex climate prediction, applications, and disaster risk reduction data. In terms of technographic variables, this audience is made up of professionals with diverse backgrounds and training—some are trained as scientists while others are social scientists. This means that the scientific messages from the climate scientists and meteorologists have to be packaged in various ways to reach such an audience. Hence we recommend the use of social media because it is likely that the audience has access to internet, laptops, and desktops and has the necessary technical skills. Second, since this audience can read, we recommend messages designed in the format of features in newsletters. Third, we recommend the use of forums to promote a dialogue in which meteorologists and these sector officers meet to discuss the complex scientific information. The idea of dialogue is emphasized so that this audience is given a chance not only to get information but also to discuss what the downscaling of the climate outlook means for each of these sectors and how they will communicate this to the end users in each country in the sub-region. Unlike the previous scenario breaking down this particular audience presents ICPAC an opportunity to understand them better and hence communicate the complex climate information, products, and applications more effectively.

Media:

Like the audiences described above, the media can be segmented using demographic, psychographic, and technographic variables. The results of the SWOT analysis show that this audience is made up of educated men and women of all ages. Most of this audience have access to the internet, and computers and have the necessary skills. The role of the media in communicating climate extremes, prediction, applications, and disaster risk reduction cannot be over emphasized. Numerous scholars have suggested that the media emphasize certain issues and by doing so transfer the salience of these issues to the public agenda (McCombs, 1997; McCombs & Shaw, 1972; Scheufele & Tewksbury, 2007; Spence & Pidgeon, 2010). Other scholars suggest that the media do not simply tell the public how to think about certain issues but frame these issues in such a way that influences the way the public thinks about them and understand them (Entman, 1993; Scheufele, 1999; Scheufele & Tewksbury, 2007; Spence & Pidgeon, 2010). In the case of climate change, Spence & Pidgeon (2010) argue that the media can frame the issues in a positive way so as to influence human behavior. Hence we recommend that communication designers should work with climate scientists, meteorologists, and the media to put the issues of climate extremes, prediction, applications, and disaster risk reduction on the public agenda by framing the issues in such a way to convey the seriousness of these issues. For instance, communication designers could work with all sectors, especially climate scientists, meteorologists, and the media to explain the meaning of the complex scientific data. Unlike hard news stories feature stories offer a chance for journalists to give details and background information. As we have seen in the previous case, breaking down this audience presents ICPAC an opportunity to understand them better and hence communicate the complex climate information, products, and applications more effectively.

Politicians, Policy makers, and government officials from the sub-region:

Like the audiences mentioned above, this audience can also be segmented using demographic, psychographic and technographic variables. According to the results of the SWOT analysis, politicians, policy makers, and government officials are made up of people from various professions – social scientists, liberal arts, lawyers, accountants, administrators. This audience may be highly educated men and women of all ages. Many of them are affluent and hence have access to computers and broadcast media such as television. However, this audience might not understand complex climate science terminology. In order to communicate complex science information to this audience we recommend using a number of strategies. First, this audience should be engaged in dialogue through various forums such as radio and television panels in which complex scientific data is discussed. This can ensure that this audience participates in the dialogue and are not just passive onlookers. Second, this audience can be reached using feature stories in newspapers explaining the complex scientific climate information. In the same vain as above breaking down this audience presents ICPAC an opportunity to understand this audience better and hence communicate the complex climate information, products, and applications more effectively.

End users – farmers, women, youths, traders, fishermen:

Of all the audiences, we believe that this is the most critical to ICPAC and hence requires extra attention and effort. The results of the SWOT analyses show that this audience does not understand the complex climate science terminology. On the other hand, this audience is also diverse and needs to be broken down into smaller target groups using demographic, psychographic variables and technographic variables in order to reach a larger percentage of them (Kiwanuka-Tondo & Snyder, 2002; Kiwanuka-Tondo, Hamilton, & Jameson, 2009). This also means that the messages to each of the target groups have to be packaged differently and in different languages. For instance, the level of education among this audience varies tremendously and may be correlated with sex or gender as well as economic status. Similarly, age makes a difference in the channels that are most appropriate to reach this audience. For instance, educated youths from urban areas may be reached using social media. On the other hand, less educated youths in rural areas may be better reached using radio. The issue of power dynamics also plays a major role in the strategy that can be used to reach this audience. Women have less power particularly in rural areas and do not make decisions about which radio programs to listen to. The implication is that much thought has to be put into the selection of which strategy to use for this audience.

Mass media could be used to reach this diverse group, such as radio panels and specific talk shows on climate extremes, prediction, applications, and disaster risk reduction. This strategy has been used effectively in the AIDS campaigns such as in Uganda (Kiwanuka-Tondo, 2013; Kiwanuka-Tondo & Snyder, 2002). While the majority of this sector has access to radio even in rural areas where the majority of farmers in the sub-region, the radio programs should be in various languages since this audience may speak different languages in each of the countries of the sub-region. In addition to radio, it should be noted that most people in the sub-region and Africa as a whole including those in rural areas have cell (mobile) phones. End users with particular reading and writing literacies

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can be reached through this form of mass media, as well as feature stories in newspapers in various languages and social media for youths in urban areas. Mass media are good at raising knowledge but interpersonal channels are the best at changing attitudes and convincing people to change their behaviors (Rogers & Storey, 1987). Hence, community forums can be organized at the district or county or regional level to create trust and synergy between all sectors. These community forums should include traditional or cultural leaders and religious leaders in order to facilitate a dialogue on the use of indigenous knowledge in complex climate science information. Furthermore, traditional media such as music, dance, drama, and folklore can be used as participatory and culturally relevant forms of science communication. Hence, breaking down this audience presents ICPAC an opportunity to understand them better so as to communicate the complex climate information, products, and applications more effectively.

SUGGESTED DIRECTIONS FOR TEACHING COMMUNICATION DESIGN

While designing messages for different audiences is important for future research and practice for climate change communication, (Moser, 2010), a barrier to developing effective communication design strategies is that climate information and risk prediction occur in complex communication environments. To this end, it is suggested that using SWOT analysis for strategic planning can also be used in the classroom for teaching communication design research focused on localizing complex public communication

More broadly, communication design has been defined as a transactional and constructive practice of communication focused on developing communication artifacts, examining holistic systems and ecologies, and creating novel approaches for resolving problems (Frascara, 2006; Spinuzzi, 2012; Swarts, 2012). As a result, the responsibility of the communication designer has shifted from translating and transmitting information to the creation of spaces of “possibilities for communication” in order “strengthen the communicational power of the messages” (Frascara, 2006, p. xi–xiv).

This shift has signaled the need for strategic, holistic approaches to communication design (Spinuzzi, 2012), and understanding the role of the communication designer as a researcher, strategist, and storyteller (Zhou, 2015). “In technical communication education,” however, as Zhou (2015) argued “design is often narrowly defined as an activity of putting content on medium in a tangible format” (p. 53). Though user-centered design methods focused on “individual users in contexts” are well established in technical and communication design programs (Agboka, 2013, p. 42), these strategies are less focused on the “space of communities” (Mattson, 2011, p. 147).

By focusing on different situational contexts of localizing complex public communication and opportunities for participatory capacity building, educators might engage students in strategic communication design. This study demonstrated that SWOT analysis and multi-sectoral analysis are analytical mechanisms that can be used in the early stages of localization and internationalization, and can lead to effective strategies for designing multifaceted communication strategies rather than a single product.

CONCLUSION

Communication design is well-positioned to examine and address communicating the complexity of climate information and risk prediction (Dobrin & Morey, 2009; Wickliff, 2000; Albers, M. J., & Mazur, B. 2002; Cagle & Tillery, 2015). A lack of attention or “understanding of the frames within which communications operate” may, however, lead to communication design failures (Frascara, 2006, p. xix). Following researchers’ suggestion that communication design must examine, facilitate, and redesign systems wherein artifacts function in socio-technical ecologies (Spinuzzi, 2012; Swarts, 2012), this research study demonstrated that climate change communication problems arise from a complex environment involving multiple sectors within which climate prediction, applications, disaster risk reduction operate as a system (Markandya, Galarraga, & Murieta, 2014; Moser, 2010; Spence & Pidgeon, 2010; Vogel & O’Brien, 2006).

While this study did not investigate the production, consumption, or reception of messages or interfaces that mediate climate change communication for multiple audiences, it did illustrate strategies for understanding the opportunities and challenges for designing information that is internationalized and localized. At the same time, this study of climate information and risk prediction in the Greater Horn of African highlighted a general concern of internationalization and localization in communication design research: the need to understand cultural, political, and social contexts in order to effectively downscale and localize climate communication, such as media channels. Communication strategies that do not seriously address the culture of the audience are likely to fail (Kiwanuka-Tondo, 2013; Kiwanuka-Tondo, Hamilton & Jameson, 2009; Kiwanuka-Tondo & Snyder, 2002). Technical communicators and communication designers can further address the complexity of climate change information by accounting for both cultural usability of visual information and strategic approaches for localizing information through multimodal, multi-sectoral communication.

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Book review

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Humans are so enmeshed in mobility systems that they identify with themselves through those systems. In *Communicating Mobility and Technology: A Material Rhetoric for Persuasive Transportation*, Ehren Pflugfelder (2017) uses the term “automobility” to describe both “the specific kinds of mobility afforded by independent, automobile-related movement technologies” and “the complex cultural, bodily, technological, and ecological ramifications of our dependence on separate mobility technologies” (p. 4). Given identities enmeshed in ecologies of systems involving human and nonhuman actors through which transportation emerges, automobility is described as a “wicked problem” to be solved, in part, by technical communicators and communication designers naming and revealing the persuasive power of transportation systems. Understanding this persuasive power benefits practitioners by revealing the shared agency of automobility among the car-driver assemblage, and academics, by offering a framework for recognizing transportation as persuasive and therefore rhetorical.

The text contains seven chapters, the first two of which establish a theoretical framework for understanding mobility, and particularly automobility, as rhetorical. The framework relies on what Pflugfelder calls *kinesthetic rhetoric*: an approach where the material conditions of automobile planning, production, consumption, movement, destruction, and dependence require communication designers to engage and assist in developing persuasive environments for transportation. The next four chapters identify aspects of automobility in which practitioners and scholars alike engage in kinesthetic rhetoric: design, interface, logistics, and
navigation. At the close of each of these four chapters, Pflugfelder focuses on the practical role technical communicators and communication designers play in applying theory. The final chapter applies the theoretical framework and these sites of kinesthetic rhetoric to understanding why an electric vehicle project at a large Midwestern university failed.

Pflugfelder’s approach to the wicked problem of automobility is distinctly post-human, in that it assumes that interactions among human and nonhuman entities enable mobility, and new materialist, in that it reveals the often-hidden persuasion of automobility designs. It takes what McNely, Spinuzzi, and Teston (2015) call a “radically symmetrical perspective on relationships between humans and nonhumans” (p. 5) where agency emerges from the human and nonhuman assemblages of entities involved in transportation movement. In the case of the personal passenger vehicle, humans are among constellated actors performing mobility, a performance that represents both the activity and persuasion of transportation. Pflugfelder identifies the persuasion of transportation, in part, as “an issue of understanding the forces that coerce us into movement” (p. 4, emphasis in original) and illustrates this persuasive force as a result of “a range of forces acting together…. reinforced and experienced as compelling forms of motion, because automobile travel often quickly and safely delivers us to our intended destination” (p. 14).

This approach to transportation as rhetorically persuasive requires technical communicators and communication designers to act as symbolic-material as well as symbolic-analytic workers capable of articulating and designing the persuasive environments of mobility systems. Pflugfelder relies on Johndan Johnson-Eilola’s (2005) application of Robert Reich’s (1991) “symbolic-analytic work” to differentiate between symbolic-analytic work’s focus on symbolic meaning-making and symbolic-material work’s focus on materiality. Pflugfelder identifies technical communicators and communication designers as “those that seek out deeper understandings of how cultural assumptions are coded into material productions and how those designs are continually re-cast as culturally meaningful objects” (Pflugfelder, 2017, p. 13). For practitioners, such work enables encoding of ecologically
responsible and ethical values into the material products of mobility; for scholars, such work encourages identification and critique of existing persuasive efforts in transportation.

Pflugfelder relies on both classical Greek and modern rhetorical theories in crafting his approach. Among the modern theories, Bruno Latour’s (2005) actor-network theory provides much of the heavy lifting, especially in locating persuasive agency emergent among assemblage actants. However, Pflugfelder departs from Latour’s insistence on a biological determinism in human/non-human assemblage agency, countering that “a great deal of what can be defined as persuasion occurs beyond or beneath human intention” (p. 23). He organizes his argument around an introductory chapter that explains “how networks of people and things are persuasive” (p. 17).

Chapter two focuses more directly on mobility and its relation to rhetoric, positing kinesis, Aristotle’s term for movement with limits, as “a rhetorical term for persuasive movement” (p. 17) which he calls “kinesthetic rhetoric.” These two chapters provide technical communication and communication design practitioners useful frameworks for understanding their designs as persuasive to assemblages of human and nonhuman entities functioning as agents of automobility. For scholars, these chapters offer methodologies for tracing rhetorical agency beyond actor-networks into posthuman, material assemblages in mobility fields.

Chapter three, in turn, does the work of addressing the persuasiveness of material in design. In this chapter, Pflugfelder connects design science, focused on approved and appropriate methods for solving design problems, with explicit techne, a universal “set of techniques used to accomplish something” (p. 46). He then connects design thinking, focused on applying heuristics for solving design problems, with abstract techne, a messier approach to rhetoric and activity that applies “knowledge about the relationships between different actants” (p. 46, emphasis original). He continues to argue that technical communicators should incorporate a combination of both in automotive designs toward engaging and matching the hyle, “a Greek term for the material in a given project” (p. 17) to the design and manufacture of automobiles as kinesthetic rhetoric. Hyle-centered application of explicit and
abstract techne, combined with metis ("cunning intelligence," p. 56), results in user-centered designs so long as the concept of users is expanded to include non-human and human agents: "we have other actants to consider, some of them nonhuman, some of them deeply important to a design’s success or sustainability" (p. 56).

In examining these concepts, Pflugfelder argues that attentiveness to the hyle in design processes that incorporate both design science and design thinking helps designers avoid "ignoring the persuasive materials in a design" (p. 57). He identifies this attentiveness as an important role for technical communicators and communication designers, whose scholars must study the hyle of materiality in terms of its persuasiveness in design projects and whose practitioners must engage both explicit and abstract techne in advocating material designs for effective communications in automobility.

Chapter four addresses the relationship between metaphor and interface and encourages scholars and practitioners to unveil both the metaphors at work in interfaces and the importance of understanding interfaces not merely as surfaces or visual displays but as a "thin, non-geometric layer" where systems intersect (p. 67). Pflugfelder argues that "metaphors function as more than linguistic representations, but as elements within interfaces that help facilitate communication between humans and nonhumans" (p. 72) and, more generally, among interrelated systems. He advocates for the role of technical communicators and communication designers "working alongside interface designers in innovative transportation projects... to facilitate the development of useful metaphors for users" (p. 78). Scholars and practitioners are called upon to engage in innovative design projects by revealing the underlying metaphors that inhabit interfaces and to advise designers on effective interfaces that capitalize on culturally familiar metaphors.

Chapter five introduces a rhetorical understanding of logistics "as a persuasive series of connections that allow for compelling use" (p. 90). Compelling logistics are design and interface decisions that result in a trajectory or movement we seek to continue making, one that becomes habitual, while logistics that are less compelling, that do not energize users, are "less persuasive than other competing
logistics” (p. 92). The role of technical communicators and communication designers in automobility design projects is to help designers build compelling logistics based on giving voice to its users, helping designers recognize the kinds of mental maps that specific logistics enable or disable toward more or less persuasive designs. Practitioners work to keep logistics user-oriented by addressing the hyle of materials and the metaphors of interfaces, while scholars identify, research, and suggest logistics that enable compelling mental maps and persuasive designs.

Chapter six focuses on mapping writ large as “navigating the world with mobility technologies” (p. 99). Pflugfelder describes the process of navigation using mobility technologies as “a complex human–nonhuman hybrid performance” (p. 99) that focuses on the ever-shifting and emergent agency of automobility. Human and non-human actants negotiate navigational agency. Successful navigation requires successful negotiations of agency in kinesthetic rhetoric, negotiations that designs of increasingly automated automobility must take into account toward persuasion that such hybrid performances of automobility are safe, efficient, effective, and useful. The role of the technical communicator and communication designer in such design is to help drivers “into gradually understanding autonomous mobility” (p. 117): its design, its interface, its logistic, and its navigation. Practitioners assist in developing designs, interfaces, logistics, and navigation tools that are adequately familiar to users entering autonomous mobility units, while scholars study and research autonomous mobility to identify its connections and disconnects with users in design, interface, logistics, and navigation.

In chapter seven Pflugfelder’s applies his ideas of articulation of kinesthetic rhetoric to a specific, failed Electric Personal Transportation Vehicle (EPTV) design project to help engineers, designers, and communicators “understand why it was not persuasive—as a project design, as a site for new interfaces, as a new logistic, and as a new techne of navigation” (p.121). Because kinesthetic rhetoric is a new theory, Pflugfelder is better able to identify the shortcomings of a project that “failed because it was unsustainably compelling to designers and users” (p. 138, emphasis...
in original) than to focus on automobility design that successfully persuades.

In sharing the shortcomings, the chapter offers a heuristic for designers and communicators alike to develop mobility projects that succeed by successfully implementing kinesthetic rhetoric. He suggests the following approaches as aspects of this heuristic:

- Advocate for integrating actual users in project conceptualization and design;
- Consider the roles of nonhuman materials in designs, and maintaining focus on the *hyle* of materials;
- Help to guide the design of user interfaces and metaphors on which interfaces are based;
- Research how users make sense of large transportation systems and apply this knowledge to system interfaces;
- Record and research the scripts that go into the design and manufacture of technologies;
- Conduct user experience testing on interface designs, then recommend changes based on user experiences; and
- Identify moments of *metis* and *kairos* in typical acts of using mobilities technologies.

By noting these topics, Pflugfelder offers kinesthetic rhetoric as praxis vital to addressing the wicked problem of the internal combustion engine automobility.

Pflugfelder, in turn, builds this praxis on the theoretical foundations of Aristotelian rhetoric, Latour’s actor-network theory, and new materialist approaches to rhetorical agency. For each theoretical argument presented, Pflugfelder focuses on the practical role of communicators in applying rhetorical theory, both at the close of each chapter and in the closing chapter of the text. And finally, he closes the book with this reminder to technical communicators and communication designers — scholars and practitioners alike — that “if we want to envision change in [automobility,] a system so deeply ingrained into everyday life, we need to embrace new methods and new positions that understand
and engage the relations between materiality, movement, and persuasion” (p. 155).

Kinesthetic rhetoric is a convincing set of methods and positions newly available to technical communicators and communication designers for research and practice. While Communicating Mobility and Technology’s highly theoretical approaches appears to be written primarily for scholars, its application sections are approachable and well-suited to those who bridge the gap between scholarship and practice. The text will be of particular interest to scholars and practitioners who work within and around large systems and ecologies similar to automobility, including fields and sites like disaster communication, public transportation systems, government agencies, environmental rhetorics, and logistics planning.

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What if something as seemingly routine as an email or an interoffice memorandum could make the difference between preventing a crisis or allowing a dangerous situation to deteriorate? This is the question Carolyn Boiarsky asks her readers to grapple with in Risk Communication and Miscommunication: Case Studies in Science, Technology, Engineering, Government, and Community Organizations, as she presents analyses of communication artifacts in case studies from the last few decades of US history. In a year that brought catastrophic flooding in Louisiana and national controversy over a proposed oil pipeline’s threats to drinking water and sacred sites on Native American land, Boiarsky’s case studies—which include the 2010 BP/Deepwater Horizon oil rig explosion, the 2011 opening of the Mississippi Spillway during river flooding, and the 2014 expansion of the Enbridge Pipeline after a leak in Michigan four years prior—are a timely addition to the literature on risk communication. Communication designers will find this book particularly useful because of its concrete, actionable strategies for practitioners and chapter summaries that lend themselves to quick access for future reference.

Other approaches to risk communication have highlighted the role of extra-linguistic factors and participatory approaches: for example, Liza Potts (2014) emphasizes distributed agency, participatory design, and holistic experiences in her examination of social media in disaster response, and Lundgren and McMakin (2013) advocate for participatory approaches to risk assessment, stakeholder involvement, and consensus communication. Boiarsky’s book is a useful complement to these approaches, for
while she acknowledges the complexity of risk communication and audience engagement, she (re)trains our focus on the powerful role that a single text or set of texts can play. It is imperative, then, for the writers of texts in at-risk or crisis situations to consider “the context in which the documents will be read and the pattern in which readers will read the messages,” she argues (p. 4).

To this end, the case analyses are accompanied by sets of clearly explained, actionable strategies for replicating successful practices and avoiding mistakes exemplified in the documents examined for the case studies. This approach makes it easy for practitioners to learn from others’ successes and failures and apply the takeaways to their own work. For example, one strategy presented in the book is to avoid unnecessary jargon and to explain key terms, and Boiarsky models this in her own writing, which is aimed at practitioners and students.

Her presentation of the strategies and the cases themselves is accessible for readers who may be unfamiliar with theories and concepts in rhetoric and technical communication. Similarly, each chapter is accessible as a standalone piece, so concepts and cases are introduced or re-introduced accordingly, and each chapter ends with a summary of key points and takeaways. Indeed, Boiarsky takes care to narrate and explain the communicative situations she analyzes, drawing the reader into the accounts of both successes and failures—and the high stakes of those successes and failures. Her approach is useful for practitioners because no prior knowledge of the cases is required, and the narratives are both compelling and clear.

The first chapter centers on the Chicago flood of 1992 and how a failure to repair a leak in an underground tunnel wall resulted in the flooding of the city’s downtown, including its financial district and upscale retail district. (The resulting losses totaled more than $1 billion.) Boiarsky analyzes the memorandum written by the chief engineer to his division manager recommending that the leak be repaired, to which the manager responded by sending the project out to bid, creating a delay during which the leak became a flood. Had the chief engineer written a more reader-focused memo, taking into account the manager’s lack of engineering expertise, and had he followed city protocol of hand-delivering the memo
with a request for immediate action (rather than sending it through interoffice mail), the repairs might have been made in time. The documents themselves are included as figures, and Boiarsky analyzes the organization, tone, content, and style of the documents, offering solutions and strategies grounded in research-based knowledge of readers’ reading patterns and expectations. The strategies offered—such as organizing a text to front crucial information—will appeal to practitioners because they can be applied to a range of communicative situations.

In the first chapter, as in other chapters, Boiarsky draws on primary and secondary sources from the case to create a focused and compelling narrative of the crisis itself and of the communicative situation. The information and strategies she offers for understanding and working with (rather than against) readers’ processes and expectations are grounded in reading research spanning more than three decades. Though the citations are more suggestive than representative of the depth and nuances of research knowledge on reading, they support the adaptable heuristics Boiarsky offers for understanding and responding to readers. For example, practitioners and students (as well as teachers) will likely appreciate the usefulness of understanding the three-step model through which readers engage a text—by predicting what the text will be about, reading the beginning material to see if their predictions are met, and then reading fluently if the predictions and text are aligned or, if not, stopping or reading without fluency—for making their own texts more reader-focused. Students and practitioners may need to look beyond this book, however, for concrete strategies on gathering specific knowledge about their readers and testing messages with readers.

While Chapter 1 narrates a case of miscommunication, Chapter 2 focuses on successful risk communication about the opening of a spillway during the 2011 Mississippi River flood. Boiarsky analyzes a series of letters from the Army Corps of Engineers to residents and property owners in the spillway area, noting that the letter writers effectively responded to the rhetorical situation, particularly the “economic, political, social, cultural, and psychological environment” in which readers were encountering the letters (p. 28). This chapter’s strategies are organized by focus
(for example, including both the reader’s and the writer’s purposes), content (for example, accounting for the needs and wants of multiple sets of readers), organization (for example, aligning organizational patterns with reader and writer purpose), and readability (for example, explaining key terms and keeping sentences simple and short).

Chapter 3 complements the focus of Chapter 2 on strategies for communicating information by offering strategies for persuasive, argument-driven communication, drawing on documents from two sides of the ongoing debate regarding the continued use of coal. Here again writers are encouraged to account not only for their own purposes and concerns but also, and especially, for the purposes and concerns of their readers, which is all the more important when readers may be inclined to disagree. This chapter’s strategies are particularly useful for practitioners for whom risk communication involves not only distributing information but also persuading skeptical audiences who may have affective and material reasons for objecting.

In the final two chapters of the book, the focus shifts to digitally mediated risk communication: specifically, electronic media (such as emails and text messages) and slideware (such as PowerPoint). In Chapter 4, which offers perhaps the most compelling analyses, Boiarsky examines email messages from two cases: the 2003 Challenger shuttle breakup and the 2010 BP/Horizon oil rig explosion. The Challenger analysis focuses on emails about the damage caused by the impact of a piece of Spray On Foam Insulation (SOFI) that fell off and struck the left wing of the shuttle during launch. In so doing, Boiarsky is careful to note that even if NASA had investigated the damage more thoroughly and attempted a rescue, the accident may still not have been prevented. Her analysis, however, focuses on communicative mistakes that likely impeded a more effective response, particularly poorly organized messages, messages with too much jargon, and messages that inappropriately followed social media conventions (I-based discourse and opinions) instead of reader-focused strategies for clear communication.

Similarly, email artifacts from engineers’ conversations about the insufficient number of centralizers (metal strips that keep cement
evenly distributed in the well) provided for the BP well and the
subsequent decision to proceed with plugging the well despite
unsuccessful test results reveal communicative mistakes. These
include failing to provide sufficient context for information, relying
on social media-style discourse, and using email to communicate
complex information when a phone call or in-person meeting
would have been more appropriate. Boiarsky’s strategies focus on
applying conventions and principles of business writing (like KISS,
or Keep It Simple, Stupid) to email composition, from organizing
content to acknowledging receipt of messages.

Chapter 5 offers an analysis of an effective slideware presentation
designed by Enbridge to inform and persuade local communities of
the benefits of expanding an oil pipeline in the wake of recent leaks.
Boiarsky highlights the visual rhetoric of the Enbridge
presentation, particularly its use of images, but she also provides
strategies for text-based presentations, even offering the chapter
summary in the format of text-based presentation slides.
Practitioners, students, and teachers will appreciate Boiarsky’s
recommendations for coordinating visual and textual information,
as well as slideware, handouts, and oral delivery, to achieve
maximum effectiveness and to avoid cognitive dissonance. For
example, making sure that each slide can be read in 10 seconds or
less and pausing for 10 seconds to allow the audience to process the
slide can eliminate the dissonance created by expecting people to
process textual and aural information at the same time.

*Risk Communication and Miscommunication: Case Studies in Science,
Technology, Engineering, Government, and Community Organizations* is
a valuable contribution to the literature and a useful resource for
students and practitioners seeking concrete strategies for creating
reader-focused texts in at-risk or crisis situations. It is a quick read,
and the end-of-chapter summaries are excellent resources to
consult. The cases Boiarsky presents provide not only actionable
strategies for practitioners and students, but also a framework for
further research into reader-oriented risk communication strategies.
Practitioners and scholars looking to build on Boiarsky’s work
might focus on how the reader considerations presented here could
be localized for specific contexts and situations, particularly when
those contexts involve communicating not only across different
areas and levels of expertise but also across cultural and linguistic differences.

References
