

PRAGMATIC FEMINIST EMPIRICISM: AN ORIGINAL ANALYTICAL FRAMEWORK
FOR TECHNICAL COMMUNICATION

by

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Focusing on issues of embodiment and power in technical communication specifically through visual discourses of health and medicine created through data, the research is an introduction to an original methodology called pragmatic feminist empiricism. Pragmatic feminist empiricism urges technical communicators to acknowledge their own embodiments to inform the creation, reflection, and transformation of medical discourse; value differences in the embodiments that are both represented and served by medicine; and consider the multiple aims inquiry may serve and their impact in both private and public spheres. Pragmatic feminist empiricism draws upon Miller's notion of the social construction of knowledge as well as Hayles's concept of skeuomorphic design in creating more inclusive definitions of health and disease. The research centers on tropes in medical rhetoric that lean toward creating standardized visual representations of bodies to represent norms and their dangers to public health, as well as the effect of medical discourse on embodiment of health and disease that are represented in medical models. Case studies of the Visible Human Project® and several anatomy textbooks use pragmatic feminist empiricism to identify exigencies in visual medical technical communications and to reimagine how images may be designed to create more inclusive definitions of health and disease. In addition, a study of pragmatic feminist empiricism as a

pedagogical tool for teaching Scientific Writing demonstrates the power of education as a change agent in expanding discourses about health and disease to acknowledge and value multiple embodiments.

PRAGMATIC FEMINIST EMPIRICISM: AN ORIGINAL ANALYTICAL FRAMEWORK
FOR TECHNICAL COMMUNICATION

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by

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For Mom and Dad, with all my love.

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∞ Denotes reflective passages62, 68, 72, 166, 170, 171

Pragmatic Feminist Empiricism: An Original Analytical Framework for Technical Communication

CHAPTER ONE

Locating the Rhetorical Power of Technical Communication in Medical Humanities

In medical research, current policies reflect the ways technical communications tend to lean toward the production of bodily representations that promote universal definitions of health and disease.¹ Work at the intersections of rhetoric and feminist theory is needed to help create more inclusive definitions of health and disease for all constituents of the medical field. This chapter serves as an introduction to exigencies that necessitate the need for intervention through technical communication—exigencies that include challenging the social values that are embodied in both the technical communicator as a professional and the representations of bodies that technical communications are meant to serve resulting from androcentric models upon which medical beliefs and values are based. The danger of not challenging representations of bodies that define health and disease becomes a matter of life and death for those seeking medical intervention. These representations have the power to create, reflect, and transform discourse surrounding health and disease—it is important for these representations to encompass the most thorough picture of experience possible. The de-emphasis of differences in embodiments and the refusal to acknowledge them creates and reflects disparities through technical communication that may disempower certain groups. Acknowledging and addressing these disparities could save lives if multiple sites of inquiry are identified in the design and reporting processes—if only a more feminist approach, I argue, is taken.

¹ In standardizing bodies, scientists hope to offer standard or “universal” definitions of health and disease to standardize treatment. Researchers in cardiovascular health, for example, have called for universal definitions in order to work toward less fluid treatment goals (Alpert and Thygesen, 2006).

To me, feminism entails inquiry and observation that takes into account multiple points of view. At times, I have struggled with the concept in that I have been concerned with how different types of feminism tend to overthrow dominant discourses in favor of replacing them with those focused solely on women's experience.² This, however, is not always the case: in theorizing my own understanding of feminism I follow scholars such as Mary Lay, Christina Hughes, Sandra Harding, and Helen Longino in advocating an approach that does not engage in the subversion or decentering of one point of view in favor of another. Feminism is meant to acknowledge marginalized groups and to offer multiple perspectives not instead of but in addition to dominant discourses. What makes feminism well-suited for this type of acknowledgement of embodiments is its ability to provide a critique of identities based on sex and gender, which directly addresses the issue of the androcentric foundation of medical science and the ways that health and disease are impacted by sex, which I will discuss in further detail later in this chapter. In addition, feminism lends itself to intersectionality in that cultural, social, and institutional values impact all embodiments and identities—not just those based on sex and gender. Intersectional feminism acknowledges that all perspectives have biases—including those that currently inform medical practice—and I argue that collecting many perspectives with diverse biases is effective for the creation of knowledge when they are put into conversation with other embodied discourses such as sex, gender, race, etc. Biases do not necessarily equate to being negative. When conversations in scientific research become more feminist, they become more inclusive and, consequently, more effective in building knowledge and improving future research. Feminism creates inclusivity through inquiry. For any communication in science that is not inclusive and considered bad science, there is a need for inquiry through new methodology

² The concept of a singular women's experience is, I realize, problematic, and is addressed later in this chapter. I do not agree that there is a singular women's experience, which reflects some early criticism of feminist theory as being based on Western, white experiences that in itself has the power to marginalize.

(Longino & Doell, 1996). It is for this reason that this dissertation develops a methodology to create more inclusive discourse involving health and disease through feminist inquiry, focusing on technical communication as a site at which improvement in design and evaluation must occur through the acknowledgement of embodiments. The methodology I propose is an analytical framework rooted in technical communication, rhetorical, and philosophical study that recognizes the knowledge- and meaning-making processes involved in technical communication are multi-faceted and valuable. The acknowledgement of the way one's unique embodiment functions in the design process in technical communication is useful in that biases may be helpful or harmful in representing health and disease.

Embodiment is a complex term that refers to values or beliefs that are informed by experience of the self and the world, and for any individual there are a number of embodiments that may be working together based on a specific situation. Following Butler's (1993) concept of performativity and the way that inside and outside forces impact bodily reactions and shape identity, technical communication may also act upon the body to shape and be shaped by embodiment. Technical communication is an area in which values that are embodied by the designer of technical communication are reflected in representation and may yield discourse that becomes recursive—discourse that impacts lived bodily experience, or embodiment. This is to say that the designer of technical communication—the technical communicator—uses her own embodiment of institutional and personal values to shape technical communication to reflect those values. The technical communicator, thus, has a unique opportunity to make choices in the design of technical communication that may adhere to or depart from strong institutional social values that her creation may embody. A professional identity or institutional affiliation tied to the creation of technical communication, however, often produces the most recursive discourse. For

example, a scientist working for an organization will embody professional institutional values through affiliation that require her to create technical communication that reflects those values in order for her to retain her status or position within the organization. Feminist inquiry applied in technical communication, then, may help to challenge and expand institutional values to make discourse more inclusive. In medical fields, feminist inquiry provides an opportunity to improve inclusivity in definitions of health and disease by identifying and acknowledging moments of convergence and divergence of difference in values, then calling into question which subjects are either empowered or disempowered by the representation of these values.

Technical communication produces not only a series of actions and reactions, but discourse. I use the term *discourse* to refer to not simply linguistics, grammar, meaning, or syntax, but language production that comes from the social nature of differences in value of meaning. Discourse as a product of technical communication is part of an interactive process of making and ascribing meaning that is embodied. There is “that reiterative power of discourse to produce the phenomena that it regulates and constrains” (Butler, 1993, p. 2). Like bodily systems, embodied identities are formed from discourse produced by technical communication within social systems.

Discourse as a product of technical communication is part of a powerful social process. In her book *What is Discourse Analysis?* Taylor (2013) draws distinctions between the power of discourse to shape and be shaped by social phenomena. Discourse, according to Gee (2014), is “saying, doing, and being” (p.2). This means that language has the power to communicate, influence beliefs or actions, and create identity. Cameron, Frazer, Harvey, Rampton, and Richardson’s “Ethics, Advocacy, and Empowerment” (1993) relate the production and repeated patterns of discourse that may be transmitted through technical communication to Foucault’s

“regimes of truth,” which they define as “sets of understandings which legitimate particular social attitudes and practices” (p. 125). Discourse, then, may preserve or alter the status quo. Discourse reflects the relationships between power, language, and identity through the study of technical communication.

Technical communicators have the unique opportunity to shape discourse and to question whether or not the embodiment of regimes of truth is beneficial or harmful to constituents of their representations. In a strong example of how technical communication both embodies and creates, reflects, or transforms discourse, Mills (1997) notes that the assignment of identity markers has the potential to affect patient and doctor perception of health and disease and society’s perception of health and disease, which can affect healthcare policies. Discourse has causal effects³ that may influence embodiment of identity and may even alter social behavior (Fairclough, 2003). This means that when discourse produced by technical communication informs regimes of truth, discourse becomes recursive in that it may inform new technical communications that support regimes of truth—whether those regimes of truth are positive or negative for the wellbeing of the public.

Embodiment plays a part in influencing the many roles or identities that the technical communicator might assume in shaping discourse, and in turn these roles and identities also shape embodiment. According to Birke (1999), “We perform many roles, any or all of which could influence bodily workings...implicit in these systems is active response to change and contingency, bodily interiors that constantly react to change inside or out, and act upon the world” (p. 45). This notion of understanding context and its role in shaping embodiment makes the interpretive process of defining bodies difficult for individuals and technical communicators

³ “Causal effects” refer to Fairclough’s (2003) notion of the potential for discourse to have an impact on social phenomena governing individual and societal behaviors.

(Marshall, 1999). When we examine differences in embodiments, or “divisions,” we can understand what internal and external factors play a part in shaping identity and which traits of embodiment are valued in discourse communities (Grosz, 1994; Marshall, 1999). The experience of communication influences the creation, reflection, and transformation of discourses that shape embodiments. Kynell-Hunt and Savage (2003) reference Cooper’s notion of participatory communication⁴ to identify the role of the technical communicator as being an active part of interpreting which values are communicated in order to produce certain discourses. Identifying the role of professional communicators (or technical communicators) as being shapers of values to create discourse necessitates the need for evaluative methodologies to help communication in medical fields, especially, to be more inclusive in order to achieve medical progress.

Embodiments are constructed through experiences with technical communication that reflect and create discourse, and they may work to influence the experiences of others when they act as media for representing, as one basic example, a human body in a state of health or disease.

Technical communication gains rhetorical power through participatory communication among agents that shape discourse through their embodiment. My own embodiment as a scholar of medical rhetoric informs this dissertation as technical communication—through which I hope to change discourse regarding how the field creates more inclusive definitions of health and disease. It is important, then that I acknowledge my unique embodiments of both field and lived experiences in the world to recognize how they inform the concepts I will put forth in the framework that I theorize. It is also important to acknowledge that my embodiments are not

⁴ Participatory communication, as defined by Cooper(1990) in a paper entitled “Model(s) for Educating Professional Communicators” delivered to the Council for Programs in Technical and Scientific Communication(CPTSC), is an agential approach to communication where she writes that “I am defining communication as participatory communication, and the role of professional communicators as one of sharing interests, or working together to create common interests, to construct the ideals of our society, to examine the ends of action” (p. 12).

entirely my own—they are constructed from established belief and value systems that inform my perceptions. As a technical communicator working in medical rhetoric, I address this dissertation to technical communicators in the medical field, in hope that medical professionals who research and practice will realize the roles that their own embodiments—through institutional, social, and cultural states—play in how they approach technical communications about health and disease in their respective fields, and the impact of their research on public health. I will theorize a methodology to accomplish this acknowledgement in Chapter II which I call *pragmatic feminist empiricism* in order to help technical communicators. Pragmatic feminist empiricism is an original framework which calls upon the technical communicator to acknowledge their own embodiments, to acknowledge the embodiments of those represented and served by the technical communication, and to consider the multiple aims the inquiry may serve. Chapters III and IV operationalize the methodology in relation to both three-dimensional medical models (i.e. the Visible Human Project®) and two-dimensional technical communications such as anatomical atlases. In addition, I address instructors in medical rhetoric (who I argue are also technical communicators), following my belief that one of the best ways to change discourse is in the classroom, which I will discuss in Chapter V.

I write this dissertation through my own embodiment as a scholarly researcher in medical rhetoric and technical and professional communication as well as from the standpoint of a woman served by medical research—a part of the public whole. In being both an individual and member of the public and a researcher who interacts with medical fields in both private and public spheres, I embody much of my research as a creator, mediator, and product of technical communication inside and outside of the classroom. I hope to provide pragmatic feminist empiricism to help technical communicators value embodiments like my own and embodiments

that are entirely different—for we all have knowledge and value in experience to produce a collective understanding of states of embodiment for medical progress and for expanding medical care in public health.

Through my own experience as both an instructor and a student in the classroom, I value the power of rhetorical analysis in composition, which directly relates to technical communication in that technical communication participates in the construction of the social through representation. Science is rhetorical as a field in general: according to Haraway (1996) “From this point of view, science—the real game in town—is rhetoric, a series of efforts to persuade relevant social actors that one’s manufactured knowledge is a route to a desired form of very objective power” (p. 250). Haraway’s notion of science-as-rhetoric rings true especially in the case of medical humanities and supports its connection to technical communication as rhetorical. Rhetorical analysis of the ways health and disease are represented⁵ through technical communication reveals sites of bias in the interpretation, value, and representation of certain embodiments in medical knowledge.

Preventing Future Cases of Yentl Syndrome and “Seeing” Technical Communication

One example of non-inclusive technical communication that brought me to theorize a new framework for research is an event of clinical misdiagnosis called “Yentl Syndrome.”⁶ Yentl Syndrome occurred in the late 1980s when women who took a newly approved drug for treatment following heart attack began dying suddenly (Eckman, 1998). Upon review of the clinical trial that led to the marketing of the drug, researchers realized too late that no women

⁵ The dissertation emphasizes the power of the visual as technical communication, following McLuhan’s notion that “The medium is the message,” thus an artifact may become technical communication when it is perceived.

⁶ “Yentl” is a reference to a female character made popular by Barbra Streisand who dresses as a man to get an education that was unavailable to women. Yentl Syndrome was named based on findings that sex differences operate in cardiovascular disease (Healy, 1991; Johnson, 2011).

were included in the clinical trial testing the drug.⁷ The trial design reflected the long-held belief in medicine that sex differences in a condition such as heart attack do not affect manifestation and treatment; thus the male body could act as a standard body for testing, deeming the drug universally safe for use by all patients. The larger failure of technical communication in this instance, however, came in the reporting of the data, where demographics of participants were not published. Today, while trials must include all demographics, reporting practices have not reflected inclusivity or stratification (Epstein, 2007). The failure to acknowledge differences in participant data in representation creates a false sense of how diseases respond to treatment as well as flawed definitions of disease⁸—flawed definitions which then may be taken up in future studies.

While the reporting practices in clinical trials and studies leading to events such as Yentl Syndrome piqued my interest in the rhetorical power of technical communication to affect public health, this dissertation primarily focuses on how visual technical communication may promote values that empower or disempower certain groups and create definitions of health and disease that do not accurately represent the range of embodiments they are meant to serve. Haraway (1996) uses the metaphor of vision to describe the role of feminist inquiry in science, citing the visual sense as a means for questioning binaries through observation and examining power. Because observation in the medical field is critical to making diagnoses, it is necessary to approach both written and visual technical communication together to evaluate the ways in which discourse is created, reflected, and transformed through the production of and the response to representations of health and disease—through a new, feminist methodology.

⁷ As a result, the NIH required that women and minorities must be included in clinical trials via the 1993 Public Health Service Act, section 492B, 42 U.S.C (NIH, 2015).

⁸ Scientific studies have shown that factors such as sex and race affect the manifestation and treatment of many diseases, and these embodiments have value in studying science and technology (Johnson, 2011; Beeson, 1994; Gurak and Bayer, 1994).

When Siegfried (1991) asks the question “Where are all the pragmatist feminists?” I answer her in this dissertation, advocating for the application of pragmatic feminist empiricism as a framework of analysis to design and evaluate the rhetorical power and significance of technical communications in medical fields. Being a pragmatist feminist entails re-envisioning practicality or efficiency, which I will discuss later in this chapter, as not being based on condensing points of view, but using multiple sites of inquiry to approach defining elements of embodiment, such as definitions of health and disease, in order to expand knowledge- and meaning-making in medical technical communication. When definitions of health and disease become more inclusive, there are benefits for all constituents of technical communication, as I will later show in this chapter.

When I think of medical rhetoric, or rhetoric in general, I see more than words as texts. Visual media has the power to call viewers to action and to persuade—and in many cases, to achieve justice. Because medical research is based on visual observation in examining issues in public health, I want to build a framework of analysis that benefits technical communicators who are working to visually represent bodies. Visual technical communication is worthy of study as medical rhetoric in that bodies are often observed⁹ to draw conclusions about defining health and disease. Visual rhetoric, according to Ott and Dickinson (2009), “is rooted in looking, seeing, and visualizing. It is fundamentally an optical process, although that process is registered viscerally by the body as well as symbolically by the mind” (p. 392). The symbolic power of rhetoric—whether visual or written text—is how discourse is influenced and what shapes the way embodiments are constructed through interaction, or through “reactional processes” that

⁹ While I acknowledge that there are many diseases and mental health issues not readily subject to observation through the visible, this dissertation focuses on the design of medical models as technical communication that help to define health and disease, though the methodology and exigencies I propose may also apply to technical communications that are also text-based and not necessarily reliant on visual data obtained through anatomical observation of the bodies they represent.

occur between the technical communicator and the audience (Kress & van Leeuwen, 2006). Foucault (1994) describes the “glance” as the moment when “the illness is articulated exactly on the body” and “has simply to exercise its right of origin over truth” (p. 4). Thus, technical communication as visual rhetoric has the power to reflect values of its creator and enact values onto its viewer, then inform the creation of new technical communication once again through this reactional process.

To further explain my interest in visual technical communication, I point to McLuhan’s (1964) *Understanding Media*, which discusses the levels at which individuals engage with media, categorizing media as “hot” when it requires little effort on the part for the viewer to sense the meaning or “cool” when the senses are stimulated less specifically to allow more engagement and interpretation on the part of the viewer (p. 22). Visual technical communication mediates information and embodies the values of its creator and other contexts, and the ability of the technical communication to incite reactional processes that affect embodiment depends on the medium. For McLuhan, a medium may be either hot or cool, but he does not distinguish between situations or positionality that would elicit classifying media as hot or cool. I would argue from a feminist standpoint that technical communication as either hot media or cool media depends upon the embodiment of the viewer, and that to use the binary descriptions of hot and cool to describe media, while they are helpful in imagining how reactional processes might play out when technical communication is perceived, do not particularly go the distance to theorize a methodology to evaluate levels of interaction and the impact on embodiment.

What McLuhan’s hot and cool media *can* do, however, is to point to the power of the senses in reactional processes—namely the visual. The interesting relationship between visual rhetoric and visual technical communication is that reactions to the visual are embodied.

Whether technical communication is hot or cool, the visual is registered and interpreted not necessarily through words but absorbed through the body—visual technical communication is *embodied* upon engagement. This is why inquiry and acknowledgement of embodiments is so critical to visual technical communication. Drawing on the notions of inquiry from multiple perspectives—not just those of women, but those of women and others—I want to emphasize the importance of acknowledging differences that may affect how reactional processes influence the creation, mediation, and use of knowledge in medicine through technical communication.

While a failure to acknowledge differences in Yentl Syndrome occurred on the level of binary difference between sexes, there are differences that occur between embodiments on more nuanced levels—not just based on binaries—that should be acknowledged in order to form more accurate visual representations of bodies. One of the main features of feminist inquiry is the identification and acknowledgment of value in differences, hence binaries or dualisms have no place because differences in embodiments occur on multiple levels (Hughes, 2002). This is to say that experience is not embodied in black and white (or hot and cool), but there are many gradations of experience. One critique of feminism in the past has come from the idea that women’s experiences may be combined into a single group, which is not the case, as women’s experiences may also differ depending on social, cultural, and other contexts. In many ways, engaging multiple sites of inquiry works against the empirical nature of medical research that often sets up embodiments as binary oppositions, but this need not be the case. We simply need to expand our definitions of empiricism to ask more questions.

As shown in my example of Yentl Syndrome, if inquiry does not completely serve its aims, then results fail to be grounds for establishing knowledge and meaning to be replicated and applied to future studies. This feminist approach to inquiry challenges notions of empiricism that

form the myth of pure objectivity in scientific research—that ethics and professional standards can completely limit bias. Feminist theorists writing about objectivity approach the concept from multiple angles, but most agree that there is no single truth which can be obtained and applied universally—that knowledge is available contextually, and is obtained contextually. In “Bias in Biological and Human Sciences: Some Comments” Bleier (1978) notes that bias is prevalent in all types of research, and any “truth” is not objective or value-free. She offers the example of testing fighting behavior in rodents, where androgen¹⁰ injections increase violent behavior in both male and female specimens. Interestingly, Bleier points out that in the example she cites there is no mention of whether or not estrogen would have the same type of impact. She also notes that while it is not acknowledged in the experiment, androgen is produced by estrogen. Again, the role of embodiment influences both the source of the knowledge and the interpretation of the knowledge based on what is valued.

Embodiment as Cultural Capital and the Construction of Truth

In the words of Haraway (1999), “Bodies, then, are not born; they are made” (p. 207). The way embodiment is understood is based on constructions of truth (i.e. belief) that are often informed and reified through notions of bias. In feminist theory, biases may be acknowledged and are not necessarily bad for scientific research—in attempting to be objective, feminist objectivity, according to Haraway (1996), is embodied objectivity, or situated knowledge¹¹ based on one’s embodiments as the individual interacts with the world. Biases play a role in the research process—the process of making meaning in the world is shaped by not only embodied

¹⁰ Bleier (1978) implies that androgen is the “male” hormone that controls aggressive behavior, while an absence of androgen creates more docile behavior in rodents. She is a standpoint feminist, which will be discussed later in this chapter, and is sure to point out that androgen, the “male” hormone, is only made possible through estrogen, the “female” hormone.

¹¹ Haraway (1996) engages in a discussion of situated knowledges that entails the role of a metaphorical gaze that is dominant power and discourse, controlling the way one embodies herself based on reactions to being marked by the gaze.

states, but by belief systems that may act as terministic screens through which we view the world around us (Burke, 1966). Acknowledging one's own biases may be a way to become a better technical communicator. The design of medical models, for example, may be improved through the researcher's identification of her own biases, coupled with inquiry about how those biases may impact the individual and the public. Because notions of health and disease affect the physical body, the importance of recognizing the role of bias in knowledge-making and creating representations of the body based on that knowledge has the potential to affect access to health.

Rhetorical choices in the process of representing health and disease through technical communication may influence the ways we come to know our own bodies and the bodies of others. Haraway (1996) notes that science rhetorically aids in the social construction of embodiment, noting that "Social constructionists make clear that official ideologies about objectivity and scientific method are particularly bad guides to understanding how scientific knowledge is actually *made*" (p. 250). The point Haraway makes is supported by the role of embodiment in empirical research to understand epistemology, or ways of knowing. In *Gut Feminism*, Wilson (2015) negotiates between concepts of objectivity and social constructionism, theorizing that a return to biology may prove beneficial for feminist approaches to studying embodiment. She writes:

In recent years, there has been some restlessness about the need to reject biology. There is growing feeling that the antibiologism on which feminism cut its teeth has now become politically and intellectually restrictive. It is not just feminists working in science studies or the history and philosophy of science who feel constrained by the antibiologism in feminist theory; there is also a broader sense that feminist theory would be made stronger

(for all manner of disciplinary projects) by closer engagement with biological detail. (pp. 31-32)

What Wilson proposes is a move toward acknowledging the role of embodiment in order to develop better lines of inquiry and to harness the power of bias to engage with studies of health and disease. Likewise, Segal (1995) suggests “critical repositioning” to see the full contexts of embodiment working together in the self and in others to challenge bodily medical discourses and improve them for a feminist rhetoric of medicine.

Embodiment is directly influenced by economic, social, and cultural beliefs that are mediated by technical communication. These three sites of influence are located in Bourdieu’s forms of capital (Bourdieu and Thompson, 1991). While economic capital implies a conversion to money and social capital implies the value of one’s identity, class membership, or potential to access resources to attain particular status, cultural capital is present in embodied, objectified, or institutionalized states. Cultural capital in its embodied state is the result of shared knowledge about the body in the form of discourse, which may be communicated through objects of technical communication. Discourse brokered from a doctor to a patient in the form of a policy or text about the body has the power to persuade individuals to form and embody certain beliefs about their lived experience. Knowledge and meaning are derived in interactions between agents and their embodiments. Foucault (1994) writes that “What defines the act of medical knowledge in its concrete form is not, therefore, the encounter between doctor and patient, nor is it the confrontation of a body of knowledge and a perception; it is the systematic intersection of two series of information” (p. 30). The intersections of different discourses shaped by internal and external forces that are produced by technical communication exert power over embodiment. Faber (2002) notes that “By replicating itself in different places, power quietly gains acceptance

as something natural or normal. People simply accept these relations as if they have always been there” (p. 120). Faber’s point about power is that discourse becomes a pattern that becomes recursive and is easily replicated through practice. Over time, discourse has the power to solidify beliefs about bodies and impact the way people come to know themselves, others, and the world through artifacts of technical communication. Pragmatic feminist empiricism offers a way to study technical communication and the rhetorical power of these artifacts by interrogating the origins and conditions of the discourse they embody and transmit, taking into consideration purpose and audience.

Embodiment of cultural capital in the objectified state can be identified through an analysis of tangible artifacts such as anatomical images in the National Institutes of Health’s Visible Human Project and medical textbooks, which I will examine in Chapters III and IV. Artifacts such as these represent the beliefs about health and medicine reified through discourse in the embodied state. Artifacts, or products, are the result of social processes—and science is a social process governed by many forces (Keller, 1996). Bourdieu notes that “cultural goods can be appropriated both materially—which presupposes economic capital—and symbolically—which presupposes cultural capital” (Bourdieu & Thompson, 1991, p. 50). This means the objects formed from beliefs come to represent the values and status that result from having access to cultural capital, which are made manifest as objects of technical communication. Medical rhetoric questions the origins of the objectified state to determine the influence of knowledge in the public domain as well as the private sphere, for the acquisition of cultural capital results from having the economic or social capital to gain accessibility.

In order for cultural capital to be validated as a source of knowledge or truth in the institutionalized state and embodied as knowledge or truth, agreed-upon policymaking must

occur to lead to acceptance. One example may be academic certification, where the value of cultural capital in the embodied and objectified states is established by the formation of standards in belief recorded and enacted through academic entities such as through degree-award, tenure review, or publication. To offer a more specific example, beliefs about the body and its status as “healthy” or “diseased” are founded on agreed-upon conclusions formed from the studies that are published about the body and from artifacts created by academic professionals in medical schools and medical research laboratories. Regulation¹² of public health found in policies regarding birth, death, and other bodily processes is part of the institutional state that influences embodiment and accessibility to knowledge. The institutionalized state acts as a gatekeeper of all forms of capital—economic, cultural, and social—for the better and for the worse. Through the use of rhetoric, the institutionalized state controls power over an accessibility to knowledge.

Another helpful example of how technical communication is rhetorical in the institutionalized state is in how public health is defined and how public health creates discourse. Public health, according to the World Health Organization (1998) in its *Health Promotion Glossary* is “all organized measures (whether public or private) to prevent diseases, promote health, and prolong life among the population as a whole.” Whether they are in public or private spaces, these “measures” are rhetorical, and as technical communications they are designed to appeal to specific audiences. As Fuller (2013) writes, “Kuypers and King defined rhetoric as the ‘strategic use of communication, oral or written, to achieve specific goals,’ including the use of the written word to persuade an audience to act in a certain way” (p. 434). The institutionalization of medical knowledge is persuasive and acts to create discourse between medical professionals and the public. Analysis and inquiry that question the rhetorical power of

¹² In *The History of Sexuality: The Will to Knowledge, Vol. 1*, Foucault (2008) identifies regulatory practices as wielding “biopower” to control populations through institutional agencies’ policies regarding embodiment (p. 140).

technical communications medical settings can help to create more inclusive understandings of health and disease for the individual and the public—understandings that value all types of embodiments in the knowledge- and meaning-making process.

As technical communicators in medicine and health-related fields, it is responsible and ethical to use multiple modes of inquiry that take into account multiple aspects of embodiment that may impact definitions, treatment, and foundational knowledge about health and wellness. There are opportunities to practice advocacy for groups that may benefit from inclusion (Cameron, Harvey, Frazer, Rampton, & Richardson, 1993). If we recognize that science is a social, rhetorical process, then we can use inquiry effectively to create more inclusive technical communication about health and disease (Longino, 1990). In moving away from universal, stabilized belief systems about health and disease, a pragmatic feminist empiricist approach will minimize gaps in communication and improve discourse in private and public contexts of what it means to understand the embodiment of health and disease in the self and in others. Pragmatic feminist empiricism is meant to serve as an analytical and evaluative framework for investigating the rhetorical impact of technical communications and emphasizing the roles and value of embodiments in defining health and disease. The framework also serves to address the multiple aims of inquiry in research and clinical practice—urging technical communicators to look to their own embodiments as sites of knowledge-making in the process of representing health and disease and to look at other embodiments in order to interrogate the possible positive and negative effects that bias may bring to research.

Agency and Technical Communication in the Professional Community

In order to fully understand the rhetorical power of the technical communicator and the need for pragmatic feminist empiricism as a methodology, identifying the agential role of the

technical communicator is critical. The agential role of the technical communicator is vital in that she is the designer, interpreter, and researcher of the subject that must be represented in many situations. She bears a great deal of the burden in executing the technical communication, and in the medical fields especially, she embodies the role of a professional ombudsman between the professional community into which she has been enculturated and the public of which she is also a part. Nelson (1990) notes that knowledge is gained through membership in communities and the study of communities. As a member of a professional community, she has been trained to use disciplinary conventions to create representations. Part of joining any professional community involves enculturation through adopting professional practices, which are learned through situated learning, or a social learning system where through a series of communication and feedback loops the budding technical communicator learns expectations of the field and profession (Spruill, Kenney, & Kaplan, 2001). During that process, field practices are learned through exposure to shared language, shared value, and shared technology, which are the tenets of Lave and Wenger's (1991) community of practice model. These tenets work together to help the technical communicator learn and incorporate specialized language and share a desire to achieve certain community goals through the use of technologies—to embody the professional identity of the work community she has joined in order to serve other communities.

The embodiment of a professional identity as a technical communicator entails the use of specific technologies to achieve goals, which may include genres specific to a field. Genre conventions are institutional technologies that are a means of responding to and achieving communication goals as, according to Miller (1984) in "Genre as Social Action," genre reflects "recurrent patterns" of communication that make up "cultural substance." This is to say that the very technologies used by technical communicators are encoded with social values that may

influence the representation created through technical communication which again necessitates a methodology such as pragmatic feminist empiricism to call these embodied social values into question.

For technical communicators, or any professionals in a community of practice, the use of genre makes all the difference in contributing to the body of knowledge of a particular field. Pragmatic feminist empiricism helps technical communicators to use and challenge genres strategically to empower those who the technical communications represent and are meant to serve. According to Devitt (1993), genre “mediates between text and context” to effectively communicate findings, which may be interpreted by other members of the community of practice. While the professional interpretation of genres may suffice in a particular of community of practice, the technical communicator should also consider the multiple aims inquiry may serve in developing representations for other agents of technical communication who will embody values in the technical communication, such as those who are served by the technical communication and, especially in medical technical communications, inform the technical communication.

Technical Communication and Embodiment at Work in Figured Worlds

Apart from identifying the values embodied in genres, pragmatic feminist empiricism also helps the technical communicator to acknowledge how she has embodied the profession and identify potential effects of this embodiment on the public and public discourse. Technical communication and embodiment are intimately connected to one another—influencing one another based on experiences of the self and the world (Grosz, 1994). The technical communicator’s embodiment of a self, a professional—mediated by the social, cultural, and institutional—must strike a balance in order to acknowledge which internal and external forces

are at work to shape rhetorical choices that reflect observations and communicate findings to the public sphere. Beliefs are shaped by any community identities that are embodied by an individual or group (Nelson, 1990). Embodiment also plays a role in the construction of the public—the technical communicator is responsible for creating representations of health and disease that are meant to both inform the public and define the public. Discourse resulting from technical communication may signify values and inscribe these values onto individual and public audiences. Products of technical communication are rhetorical in that they seek, represent, define, and embody what is valued in a discipline, revealing ways technical communicators and disciplines understand their subjects or constituents and the problems they choose to investigate. Resulting discourse continues to shape the ways in which all agents of technical communication learn to understand the world through interaction—what Gee (2014) calls “figured worlds.” Figured worlds, like terministic screens, impact embodiment and affect lived experience—pragmatic feminist empiricism may aid technical communicators in identifying the creation and influence of figured worlds on health and disease discourses.

In creating figured worlds, technical communication is a participant in promulgating institutional power that governs the way embodiments are classified as healthy or diseased, through the discourse it creates. This rhetorically powerful role necessitates the need for careful and thoughtful inquiry, which may be operated through pragmatic feminist empiricism. As Foucault (1994) notes in *The Birth of the Clinic*, power is exerted over subject bodies through medical gaze¹³ that has been shaped by institutional regulation. The regulation of bodies is made possible through policies that give symbolic meaning that is reflected through artifacts such as

¹³ Foucault (1994) describes the power of physician vision in observing the body whose condition cannot be sensed through any other entity other than the eyes that observe and ascribe meaning to observations. The medical gaze puts the physician in the position to create discursive power through observation, interpretation, and communication with the patient. The patient gaze assumes that this observation is accurate to describe the state of the body.

photographs, drawings, models, x-rays, and other technical communications. Sturken and Cartwright (2001) write in *Practices of Looking*:

Therefore the state actively manages, orders, and catalogues the properties of the body through social hygiene, public health, education, demography, census-taking, and regulating reproductive practices. Foucault argues that these institutional practices create knowledge of the body. They force the body to ‘emit signs,’ that is, to signify its relation to social norms. (p. 97)

Technical communication in medical fields, then, is a rhetorical tool that creates action through ascribing values of disciplines and the state to embodiments, which are then consumed by constituents of public health and accepted as discourse. Pragmatic feminist empiricism ensures that the rhetorical role of the technical communicator is exercised to empower and include those who are represented and served by the technical communication.

To further promote the need for pragmatic feminist empiricism as an interventional tool, it is helpful to identify the origins and pitfalls of establishing standards in medical fields. Science and medicine historically, as aforementioned, are founded on androcentric views of the body resulting from social power structures governing institutionalizing medical education and professions; thus, the male body is often understood as a “standard” for defining health and disease based on the field’s social history (de Beauvoir, 1953; Ehrenreich & English, 1973; Keller & Longino, 1996). Androcentric figured worlds shaped through discourse resulting from and contributing to technical communication limit the creation of new knowledge that may benefit all embodiments—including male bodies. By failing to study differences in embodiments, and to move toward universal understandings of health and disease, knowledge- and meaning-making are stifled in that information gleaned from the study of differences may

inform definitions of health and disease that could potentially benefit even the status quo. For example, by representing differences in models of the heart based on sex, autoimmune researchers at Johns Hopkins University are currently developing treatments for myocarditis¹⁴ in men based on observations of how the condition differs in women (Online Extras, 2010). Without studying differences in myocarditis between the sexes through representations, progress in treating the condition—which affects mostly men—would be limited. Eliminating the promulgation of androcentric values through technical communication in favor of more inclusive perspectives, thus, may make definitions of health and disease more inclusive even for constituents in dominant discourse groups. Pragmatic feminist empiricism, then, is a beneficial tool for any constituents of medical technical communications.

As Harding (1986) notes, “Against power as domination over others, feminist thinking and organizational practices express the possibility of power as the provision of energy to others as well as self, and of reciprocal empowerment” (p. 149). The term *reciprocal empowerment* is used by Hartsock (1974) in discussing power relations between dominant and subordinated groups, where empowerment originates in differences in discourse and from positionality. This is to say that power is derived from particular aspects of one’s many embodiments—both physical and symbolic—that distinguish them from other embodiments given a specific time and place. For example, when I am teaching a course on composition and discussing the lesson with my students, I am empowered by my students in that I am the only person standing in front of the classroom, no one is talking while I am talking, and I have earned a degree that qualifies me to hold an instructing position. My students, seated and taking notes, are empowered by me through my sharing with them and encouraging them to ask questions during the lecture. Positioning

¹⁴ Myocarditis is a condition of the heart stemming from viral infection that creates an inflammatory response, resulting in possible complications or heart attack (Johns Hopkins, 2016).

influences how power manifests between individuals through embodiments. This notion of positionality is part of standpoint feminism,¹⁵ where knowledge- and meaning-making are inherently different between groups. For example, standpoint feminism means that the world is understood or known for women in ways completely different and inaccessible to men.¹⁶ While standpoint feminism values differences and offers inquiry based on differences, main tenets of standpoint feminist theory seek to undermine or reposition values of knowledge. Reciprocal empowerment, nonetheless, is useful in thinking about the ways different embodiments influence modes of inquiry, which is useful when creating new knowledge about health and disease in order to expand definitions. In the case of challenging or adding to dominant androcentric views of science and medicine, reciprocal empowerment is compelling in recognizing the value of differences for public health. Pragmatic feminist empiricism challenges dominant perspectives by seeking value in multiple embodiments in order to benefit all constituents of medical fields, making reciprocal empowerment a goal.

The emphasis on value in recognizing roles of embodiment in pragmatic feminist empiricism is also derived from the basic idea that any object of analysis cannot be known without being interpreted through the body. It also is important to note that even when objects are interpreted through technology, technologies are created by individuals with certain embodiments that influence elements of their creation; thus, even technology itself embodies

¹⁵ Standpoint feminism, while valuable as part of the rich history of feminist theory, is part of the second wave feminist movement, which while recognizing that women's experiences of the world may differ from those of men, often names women's ways of knowing as being superior to those of men (Smith, 1987). Pragmatic feminist empiricism does not promote the replacing of male bias with feminist bias, as mentioned earlier in this section, though notions of situated knowledge that acknowledge difference in epistemology based on embodiment strongly influence the methodology (Haraway, 1996).

¹⁶ Another critique of standpoint feminism I would like to make here is in its treatment of dualisms: thought society does often construct sex and gender based on traditional dualisms of woman/man, female/male, I would like to note that pragmatic feminist empiricism seeks to reject dualisms in favor of recognizing differences in non-binary ways. Medical technical communication, for which this methodology is specifically created, has recognized that sex is molecularly non-binary and is thus a social construction, and gender is non-binary as well.

values based on experiences of its creator. Technical communications are constructs, where, Haraway (1999) writes:

The ‘construct’ is at the center of attention; making, reading, writing, and meaning seem to be very close to the same thing. This near identity between technology, body, and semiosis suggests a particular edge to the mutually constituted relations of political economy, symbol and science that ‘inform contemporary research trends in medical anthropology. (p. 207)

Language, technology, and embodiment combine to create technical communication, and together they ultimately construct it. In *Against Method* (1975), Feyerabend notes that what science values as truth or knowledge is a construct based on logic that has been handed down through disciplines and is mediated—where discourse makes knowing possible, and symbolic meaning through social construction attached to discourse choices plays a part in the meaning-making process. Feyerabend’s radical “anything goes” approach to scientific inquiry informs pragmatic feminist empiricism in that there is value in experience, and experiences differ. Feminist empiricism challenges notions of truth, as philosophers like Feyerabend would agree.

Feminist Science and Situating Pragmatic Feminist Empiricism

Feminist inquiry in science, according to Harding (1991), is for the purpose not of decentering male experiences completely, but to acknowledge differences and to challenge binaries. A feminist science challenges the androcentric worldview, and also challenges dominant worldviews resulting from embodiments of race and class (Hughes, 2002). In tracing the histories of scientific disciplines, including medicine and work in anatomical representation, one can find patterns in value that point to dominant discourses at work (Rude, 2009). By taking stock of what is valued in a discipline, one can identify how discourse is formed through

technical communication. By taking the time to recognize the work of embodiment in creating discourse through technical communication and the impacts, discourse may be transformed and become more inclusive.

In addition, recognizing that there are always multiple aims in technical communication, other than simply just the production of artifacts, is also part of this inquiry in that the rhetorical impact of technical communication may influence future knowledge- and meaning-making. Discourses produced by technical communication can, however, work to preserve power for dominant groups and disempower marginalized voices. Kress (2005) writes that “Representation and communication are motivated by the social, its effects are outcomes of the economic and the political. To think or act otherwise is to follow phantoms” (p. 6). This is to say that when texts are created, there is a social process that governs their creation, and speaks out against or in support of specific discourses that are controlled by forms of capital as aforementioned.

Mishler’s (1981) four assumptions that underlie biomedicine posit that (1) diseases are defined as departures from characteristics of a healthy norm; (2) diseases have specific, identifiable causes or sources; (3) diseases may be universally defined in that they have characteristic traits; (4) physicians are researchers who are completely neutral and objective in their work (Mishler, 1981). Of those four assumptions, pragmatic feminist empiricism seeks to push the most against the notions of disease characteristics as universally expressed, and the notion of the objective and neutral physician or researcher. This particular challenge to Mishler’s assumptions recognizes the value of embodiment in multiple agents—the individual as the embodiment of health or disease, and the technical communicator as the embodiment of medical knowledge and expertise. Agent roles are not static. Cooper (2011) writes that “agents are defined neither by mastery, nor by determination, nor by fragmentation. They are unique,

embodied, and autonomous individuals in that they are self-organizing, but by virtue of that fact, they, as well as the surround with which they interact, are always changing” (p. 425). There are many agents at work with a great deal at stake on both sides of technical communication in medicine—agents including the technical communicator, the audience or subjects served by the technical communication, and the public whole—and they are constantly embodying new experiences that shape their ways of knowing.

Key Scholarship across Disciplines in the Development of Feminist Science and Pragmatic Feminist Empiricism

In theorizing pragmatic feminist empiricism, understanding how feminist science grew out of philosophy is beneficial to conceptualizing the methodology. Harding (1991) and Nelson (1990) in addition to Antony and Witt (2002) cite the work of the philosopher Quine (1961) as being feminist, though he never claimed to be in his writing. According to modern feminist empiricists, Quine’s work is largely inspirational for feminist science and may be interpreted as a challenge to disciplinary traditions regarding epistemological work, though not explicitly for advancing causes for feminism. Feminists have found his work useful, however, in developing inquiry that seeks to highlight exigencies for non-dominant discourses and to question scientific values. Dombrowski (2002) notes that Quine’s empiricism, “...can act as an antidote to some of the abuses often associated with an over-enthusiasm for facticity” (p. 18). This is to say that Quine’s empiricism, like Feyerabend’s, challenges notions of any existence of a value-free objectivity.¹⁷ While Quine focuses more on language in his discussions of empiricism, however,

¹⁷ Though there is a great deal of scholarship theorizing *objectivity* differently among professional communities, I define the term generally as “pure” or “neutral” for the purpose of this dissertation. For further reading see Cambrosio, Keating, Schlich & Weisz’s “Biomedical Conventions and Regulatory Objectivity: A Few Introductory Remarks” (2009). In addition, Daston and Galison (2007) identify several iterations of the term, yet provide a thorough history of how science strives to remove all “subjective elements” from study (p. 191). Newell (1986) also provides a discussion of Quine’s empiricism in relation to objectivity.

Feyerabend's work in challenging the scientific method speaks more to notions of embodied influences, social construction, and bias:

A person's religion, for example, or his metaphysics, or his sense of humour (his natural sense of humour and not the inbred and always rather nasty kind of jocularity one finds in specialized professions) must not have the slightest connection with his scientific activity. His imagination is restrained, and even his language ceases to be his own. This is again reflected in the nature of scientific 'facts' which are experienced as being independent of opinion, belief, and cultural background. (p. 11)

Another facet of Feyerabend's work in empiricism and epistemology that supports feminist science is his insistence upon continual inquiry—that to accept a concept as truth or fact and to stop theorizing would bring stifle scientific progress. In refusing to accept any notion as a truth and to not consider the role of embodiment in a theorist's work is to accept any repercussions of discourse that may result to empower or disempower.

Feminist theorists have continued to recognize the problematic nature of scientific objectivity and neutrality and its manifestation in technical communication—an issue which pragmatic feminist empiricism seeks to address. Miller (1979) in “A Humanistic Rationale for Technical Writing” argues that all knowledge is socially constructed, thus rhetoric is necessary for understanding the origins of that knowledge and their effect on discourse. In technical communication, embodiment plays a role in interpretation and thus it becomes rhetorical: in medicine, embodiment of health and disease are the locus of study which reveals the recursive nature of discourses that are produced and reproduced through technical communication. Herrick (2005) notes that feminist theory has the ability to call into question what or who is privileged in technical communication through rhetoric, helping to include marginalized voices of not only

women, but of minorities and others who may not be represented or acknowledged as part of a larger public. In *Inclusion: The Politics of Difference in Medical Research* (2007), Epstein notes that feminist activism in science and biomedical fields has helped to open a productive space for helping marginalized groups advocate for themselves. Feminists such as Segal (1995) recognize the nature of the role of feminist inquiry in science: "...it is this critical repositioning, self-reflexive and attentive to context, that I am calling feminist" (p. 113). The attention to multiple contexts yields multifaceted inquiry that expands scientific ideals.

For Harding (1986), the most important contribution feminism has brought to science is in the development of new methods through inquiry that is embodied. As part of the research genre, five conventional methods for gathering research including narrative, phenomenology, grounded theory study, ethnography, and case study (Creswell, 2007). While the use of research genre conventions to obtain data to construct technical communications is part of professional practices and these methods are recognized, I argue that they only become feminist when they are combined with the use of methodology to reveal new types of inquiry. When data is represented in technical communication, especially when representing health, disease, or other features of the body, Hayles (1999) writes that "...[certain] erasure of embodiment is performed so that 'intelligence' becomes a property of the formal manipulation of symbols rather than enaction in the human life-world" (p. xi). This is to say that knowledge- and meaning-making are happening based on the technical communicator's construction of the embodiment of humanity in extracting "intelligence" from bodies to form representations. With feminist methodologies, combined with the use of conventional methods, more of the original human embodiments may still be present in representations. The feminist contribution of inquiry, then, informs methodology, which is different from methods that make the collection of data possible.

In creating inclusive definitions of health and disease through technical communication, methodologies become sets of analytical tools through which data collection methods are interpreted, questioned, and analyzed. In interpreting any research to create technical communication that represents data, the methodology becomes the most important way to investigate the scope of any research question and to reveal the influence of social, cultural, and institutional elements upon subjects of study. Feminist theory recognizes that knowledge may be derived from multiple sites of inquiry, and feminist methodologies have identified the acknowledgment of differences as a way to unify and obtain goals (Hekman, 1999). In establishing the value of research, and the value of embodiments, methodology becomes critical in revealing implications of the technical communication to broad audiences (Smagorinsky, 2008). Again, feminist inquiry informs methodology to expand awareness of audience while questioning the origins of value in embodiments that become rhetorical in their potential to empower or disempower groups through interaction and the creation of discourse that is embodied through that interaction.

Royster and Kirsch (2012) describe the concepts of *critical imagination*¹⁸ and *strategic contemplation*,¹⁹ tools that emphasize the imagination, meditation, and rhetorical listening²⁰ to the embodied experiences of oneself and others as valuable sites of feminist inquiry in order to better serve the needs of groups being studied and humanity more broadly. The use of these techniques are suitable for creating and evaluating technical communication in that they consider the embodiments of both the rhetor and the audience. Employing techniques in rhetorical

¹⁸ *Critical imagination* refers to the process of using the imagination “in questioning a viewpoint, an experience, an event...and in remaking interpretive frameworks based on that questioning...” in order to disrupt what one might assume is true (Royster, 2000, p. 84).

¹⁹ *Strategic contemplation* refers to “engaging in a dialogue” with the subjects one studies, even if this dialogue is imagined (Royster and Kirsch, 2012, p. 21).

²⁰ *Rhetorical listening* is immersing oneself completely in the process of understanding rhetorical practices and choices in rhetoric—the context of one’s discourse . See Ratcliffe (2005).

analysis such as critical imagination, strategic contemplation, and rhetorical listening helps to ensure that feminist inquiry is not simply for Western, white marginalized groups (i.e. Western, white women), which is one critique of feminist science which requires careful attention (Haraway, 1996; Keller, 1996; Antony and Witt, 2002; Hughes, 2002; Mohanty, 2003; Malhotra & Carillo, 2013). Imagining the effect of embodiments that are different than one's own is only possible if one acknowledges her own embodiment—if she is able to formulate her own responses to rhetoric and signify them (Scarry, 1985). By identifying the rhetorical power of technical communication and using techniques of feminist inquiry to be more rhetorically aware of effects of the discourse that may be created, one can create or transform discourse that empowers without disempowering. Evaluating design of technical communication and research from the perspectives of others aids in developing more inclusivity amongst groups served by the technical communication (Hesse-Biber & Leavy, 2007). When analyzing discourses of sex and gender reflected in technical communication, for example, Sauer (1994) writes that “A feminist perspective thus allows us to re-vision the problem of audience analysis as a conflict between the rational, de-sexualized knowledge of the expert and the non-rational sexualized knowledge of the user” (p. 321). For technical communication, feminist theory offers a look at the value of multiple perspectives—those of the communicator and those of the audience—based on embodiment. In science and medicine, as this dissertation seeks to show, feminist modes of inquiry value embodiment as a site of knowledge- and meaning-making, which is crucial for effective, inclusive technical communication.

Durack (1997) connects technical communication to the workplace and the home, demonstrating that all communication is technical communication, occurring in both public and private spheres. Her work traces the history of how the embodiment of sex affects experiences of

technology and technical communication, which is also produced through technologies. Because health and disease are embodied on private individual levels and are identified based on definitions that are publicly accepted as objective truths, design of technical communication is critical to the message it aims to send. In “Emergent Feminist Technical Communication” Flynn (1997) continues to make Durack’s point that technical communication and technology are vital in both private and public spaces. Flynn also recognizes that much of scientific inquiry is laden with constructions based on male experiences that informed the early foundations of knowledge in the disciplines. Flynn’s push for the adoption of a postmodern feminist lens²¹ for challenging epistemology is a major influence in pragmatic feminist empiricism and its application to medical technical communication in that it serves the interests of not only women, but other marginalized groups.

In addition, postmodern feminist influence “might also raise questions about the interpretive processes involved in scientific and technological inquiry” (Flynn, 1997, p. 319). While this inquiry about interpretive processes heavily influences the feminist notion of pragmatic feminist empiricism, the focus on value in primarily marginalized embodiments and their impact on knowledge- and meaning-making offsets the balanced approach to embodiment that I want to stress in theorizing pragmatic feminist empiricism as a tool for rhetorical analysis in medical technical communication. In medicine, ethical research does not imply that privileged groups deserve less acknowledgment—privileged groups are still constituents of public health, and their embodiments are sites of knowledge- and meaning-making that may benefit those who are like them and others who are not. For this reason, a study of traits in feminist theory by Lay

²¹ A “postmodern feminist lens” refers to social constructivist theories of identity that name language as the primary technology in the construct of embodiments such as sex and gender. For some postmodernists, such as Frug (1992), language not only constructs embodiment but constructs any experience with the world; therefore, language may be in turn used to undermine or embrace social constructs to find justice for the oppressed.

(1991) stressing emphasis on differences speaks to the notion of value in multiple embodiments that applies to the design process of technical communication in medicine. Lay (1991) identifies the role of technical communication in science and technology, and through analysis of various feminist methodologies offers six features that underlie the majority of theories.²² Of those six features, “celebration of difference” is one of the most important that informs pragmatic feminist empiricism and may also lead to social action in reforming current public health policies that attempt to define health and disease universally, which may cause harm, as certain embodied factors such as sex and race have been proven to affect, for example, the manifestation and treatment of certain diseases.

The framework I propose takes into account a need for acknowledging the role of differences in embodiment of the technical communicator and the impact of that acknowledgment on both physical and symbolic embodiment of constituents in the medical fields. Laduc and Goldrick-Jones (2000) help to further connect the need for feminist inquiry that examines the context of differences that Lay mentions to technical communication, situating technical communication as a site of rhetorical power in that it drives social action: “Given that . . . scholars have firmly redefined professional discourse as social action, we are now obligated to think of professional communication in relation to multiple social and cultural influences, as Mary Lay argues” (p. 247). This is to say that technical communication as a field is in constant dialogue with the field and beyond the field—including the public. There is an opportunity to engage in and be aware of the ways in which the field may advocate for groups whose embodiments are not adequately considered in defining health and disease.

²² Lay’s (1991) examination of features in feminist methodologies include six themes: “(1) celebration of difference; (2) theory activating social change; (3) acknowledgment of scholars’ backgrounds and values; (4) inclusion of women’s experiences; (5) study of gaps and silences in traditional scholarship; (6) new sources of knowledge—perhaps a benefit of the five characteristics above” (p. 350).

From the idea that technical communication may be considered a genre of research representation, technical communication does create social action. In Miller's (1984) "Genre as Social Action," "genre serves as the substance of forms at higher levels; as recurrent patterns of language use, genres help constitute the substance of our cultural life" (p. 156). Technical communication, in its recursive nature of being both shaped by and informing of discourse of embodiment, then, is indeed rhetorical and persuasive. Technical communication may control situations (Devitt, 1993). In the case of public health, calling for changes that benefit multiple embodiments in the way data is collected, represented, and reported is the main reason that the framework I propose fuses feminist theory with empiricism so well.

In *The Science Question in Feminism*, Harding (1986) critiques the dualistic nature of some forms of feminism that seek to overthrow patriarchy and the androcentric view of science in favor of a woman-centered approach. This approach to feminist inquiry in science also supports the relationship between feminism and empiricism in that it stresses the value of multiple embodiments and equal value in epistemology. Hekman (1990) notes that feminism "reject[s] the masculinist bias of rationalism but would not attempt to replace it with feminine bias. Rather it would take the position that there is not one (masculine) truth but, rather, many truths, none of which is privileged along gendered lines" (p. 9). Harding's work is also appropriate as an inspiration for pragmatic feminist empiricism in that dualisms are an inaccurate way to approach medical research, as there are not clear dividing lines in types of embodiment. For example, the early conceptions of gender identity and theory were born out of the realization that sexual dualism is a myth—intersexed bodies physiologically overturn this notion (Repo, 2015). Dualisms in science are influenced by institutional norms, where the male standard has prevailed.

Some feminist empiricists including Haslanger (2002) and MacKinnon (1982), like Feyerabend and Quine, eschew the idea of pure objectivity, as Harding also does in her work; however, these theorists tend to de-value the male experience, which is in violation of the ethical nature of medical goals to improve public health—where the term *public* is an inclusive term that encompasses many embodiments. Nelson (1990) addresses the androcentric view of science in her work, likewise noting that although this view is not inclusive, it should not be discarded because findings based on the male experience merit value in the scientific community. Harding (1986), along with feminist empiricist Longino (1990), note that bias is not always negative in research, but that it may yield potential for new discoveries to benefit science.

The resistance to exchanging one viewpoint in science in favor of another is also reflected in the work of Hughes (2002), whose notions of feminist theory in research support the value of multiple embodiments—including the value of recognizing differences between women, differences between women and men, and the pitfalls of dualisms. In addition, influence for pragmatic feminist empiricism is also found in (dis)ability studies work that emphasizes the value of embodiments that challenge normative constructs of technical communication (Jung, 2007; Palmeri, 2006; Walters, 2010). (Dis)ability studies relates to feminist inquiry in that notions of universal design that are prevalent in technical communications and normative biases are challenged by locating knowledge- and meaning-making value in embodiments that do not conform to constructions of normativity. This value of multiple embodiments and bias is another aspect of feminist empiricism that informs pragmatic feminist empiricism—the value and multi-faceted nature of bias is what necessitates the addition of the term *pragmatic* to the framework.

Pragmatism, rooted in philosophy and social work, has connections to both empiricism and feminism, as aforementioned. The term *pragmatism* is often equated to notions of

practicality or efficiency, which are indeed part of pragmatic feminist empiricism. Anderson (2004) notes the relationship between aims and inquiry in her discussion of the term, noting the rejections of dualism as a main tenet of what constitutes pragmatism—a direct connection to the feminist empiricism of Harding (1986) and Longino (1990) in its rejection of dualisms in favor of embracing differences. Frost’s (2015) work in formulating *apparent feminism*²³ also supports pragmatism in that inquiry at multiple sites—feminist inquiry stemming from value of embodied experience—leads to being more efficient in research. As a feminist methodology that directly addresses technical communication, Frost describes her methodology and its relationship to efficiency: “Apparent feminist technical communicators must rearticulate efficiency as focused primarily on audiences as a component of best results—and must draw attention to which audiences we focus on” (p. 14). A pragmatic approach to feminist empiricism, thus, is efficient in medical technical communication in that it identifies the multiple ramifications of epistemological aims, and also calls into question the inquiries that these potential aims may serve.

In a clinical trial, for example, a drug might be tested in order to help an individual overcome a disease; while the aim of the trial is to help the individual, the observations reported from the research will act as knowledge in future studies. If the drug is approved as a cure for the disease in question, then the epistemological aim has expanded once again—a move from treating the individual to adding to the knowledge-based of the study of health and disease. The same works in visual technical communication: in the case of anatomical models used in medical education, which I will discuss in Chapter IV, if students are presented with only male illustrations, students may be affected by the values of the male physique that are illustrated in

²³ The three tenets of apparent feminism include seeking social justice, identifying and engaging individuals doing feminist work who not identify as such, and recognizing that diverse audiences help to make work more efficient (Frost, 2015).

the model, and may apply knowledge gained in that one experience to other experiences in treating patients in the future. When technical communicators use data to construct a representation of empirical findings in a study, using a pragmatic approach to identifying aims and using inquiry to create a more inclusive, more accessible presentation of the data may provide a more thorough picture of health and disease.

As with Yentl Syndrome, if technical communicators had used a more pragmatic approach in reporting data from the study, then they might have asked more questions about how to approach the aims of the study that would have considered the ramifications of not reporting that no women were included as participants. Feminist inquiry seeks to ask new questions from a variety of perspectives and embodiments, citing differences as a place to gain knowledge. For visual technical communication, empiricism emphasizes the embodied experience of engaging in reactional processes with media and produces discourse. Technical communicators in medical fields as agents have the power to improve definitions of health and disease if they learn to question the impact of embodiments on themselves, others, and future inquiry. Pragmatic feminist empiricism, then, would provide technical communicators with a framework of analysis that allows them to acknowledge their own embodied experiences and those of others that might mediate, reflect, or transform the data, then question to what effect products of technical communication work to address issues for constituents in both private and public spheres to construct health and disease in more inclusive ways to inform future knowledge- and meaning-making. As Katz (1992) writes so aptly, "...rhetoric itself becomes a kind of technology, an instrument *and an embodiment* of the end that it serves" (p. 268). Pragmatic feminist empiricism identifies both the origins and effects of rhetorical power in technical communication.

Looking Ahead in Theorizing and Applying Pragmatic Feminist Empiricism for Medical Technical Communication's Past, Present, and Future

To establish the value of pragmatic feminist empiricism in technical communication on a deeper level, I will begin with a discussion in Chapter II of the historic androcentric view of embodiment and trace moves in the history of the medical discipline toward a more universal approach that standardizes bodies, beginning with Cartesian ideas of dualism. I argue in the chapter that this move is damaging to not only marginalized embodiments, but those upon which standardization has historically been based. Drawing on the work of Hayles (1999), I will show how critical inclusive technical communication is in medicine, where creating skeuomorphs²⁴ of embodiments from data could result in harm if they are accepted as truths upon which to make future assumptions.²⁵ In recognizing the role of embodiment in representing human bodies to contribute to medicine, technical communication becomes more efficient. Combining pragmatism with feminist empiricism emphasizes the multiple sites of rhetorical power that come with technical communication.

Chapter III draws more upon the notions of agency and embodiment in technical communication to demonstrate the need for pragmatic feminist empiricism to help technical communicators create more inclusive definitions of health and disease, using the National Institutes of Health Visible Human Project (VHP) as a site of analysis. The VHP—particularly the Visible Human Female (VHF)—will act as a case study of how pragmatic feminist empiricism operates to value differences in embodiment and use these differences to benefit

²⁴ The term *skeuomorph* is “a design feature that is no longer functional in itself but that refers back to a feature that was functional in an earlier time” (Hayles, 1999). In the case of medical representation of bodies, models based on data yielded from research studies are skeuomorphs.

²⁵ This phenomenon is known as the concept *Platonic Backhand*, which refers to the notion of accepting skeuomorphs as originary forms (Hayles, 1999). In the case of medicine, skeuomorphs based on study findings that define health and disease are accepted and applied to future knowledge in medical research and education.

public health. New advancements in biotechnologies such as the VHP have continued to complicate the nature of embodiment in medicine, demonstrating what Munster (2006) would call a “recombinant folding” of the lived body experience along with technology and socially-constructed beliefs about different bodies in the world. The bodies represented in technology are just that—*represented*. They are skeuomorphs constructed through the gathering of data from bodies, then mediated through technologies to become medical discourse. In this chapter, I will point to projects that use the VHP as sites of knowledge- and meaning-making, focusing on the embodiment of sex and value. In addition, I will also incorporate public reactions to the VHP as opposed to the VHM in the form of articles and other projects (including an art project) as examples of discourse that are impacted by the visual as technical communication. I will then use pragmatic feminist empiricism to evaluate the effectiveness of the project’s design as technical communication for the value of embodiments, citing scholarship in visual rhetoric and technical writing (Sturken & Cartwright, 2001; Fountain, 2014; Kress & van Leeuwen, 2006) new media and posthumanity (Haraway, 1999; Hayles, 1999; Giddings & Lister, 2011) and feminist research and methodology (Creswell, 2007; Hughes, 2002; Rude, 2009) in order to show how using pragmatic feminist empiricism in designing and supporting the expansion of projects like the VHP can impact public health in positive ways.

In Chapter IV I will offer analytical evidence from three medical textbooks²⁶ and one popular set of wall charts²⁷ to show how visual representations of embodiment communicate about health and disease in terms of dualisms and through traditional androcentric points of

²⁶ *Grant’s Atlas of Anatomy*, 13th ed. (Agur, Grant, & Dalley, 2012, 888 pages); *Netter’s Atlas of Human Anatomy*, 6th ed. (Netter, 2014, 640 pages); and *Gray’s Anatomy* (Gray, 2012, 1280 pages) will be analyzed. These texts are both historically popular in the teaching of anatomy, and rely primarily on visual representation to communicate to audiences in medical education.

²⁷ *Wall Chart of Human Anatomy: 3D Full-Body Images, Detailed System Charts* (Griffiths & McCracken, 2001, 24 pages) will be analyzed based on its popularity and availability to a lay audience and that images are based on the Visible Human Project, which will help to link back to Chapter 3 of the dissertation.

view. I will provide additional research that challenges the foundational body of knowledge upon which the medical field has based its notions of health and disease since the institutionalization of medicine, demonstrating how pragmatic feminist empiricism is valuable in both evaluative and design processes of technical communication. In addition to visual representations, I want to focus on written descriptions that accompany visual representations in the analysis, as often values that reflect institutional traditions of male-body-as-standard are reflected through language choices and the use of parentheticals to describe differences in embodiments in terms of a standardized body. As an extension of the work in Chapter III, Chapter IV will continue to draw upon Hayles (1999) to discuss the impact of the Platonic Backhand when skeuomorphic design does not provide an inclusive representation of health and disease. In addition, I will draw upon works in technical communication that focus on design, representation, and visual rhetoric as discourse (Dragga & Voss, 2001; Brasseur, 2005). The findings of the analysis in combination with evidence supporting the rhetorical power of visuals as technical communication in medicine will demonstrate the value of pragmatic feminist empiricism in creating more inclusive definitions of health and disease that may impact medical discourse in the classroom where future medical professionals are being trained to interact and share this discourse with the public through practice. I posit that changing medical discourse in the classroom through technical communication has the power to change discourse outside of the institution.

Chapter V will argue that the classroom may be a site of changing definitions of health and disease to transform public discourse, where I will draw upon my own perceptions of the classroom as a community of practice²⁸ with the potential to change discourse across disciplines

²⁸ Lave and Wenger (1991) coined the concept *community of practice* in their work on situated learning. The three tenets of a community of practice model include shared language, shared technology, and shared value in order to help a community thrive. The concept is used often in describing professional communities, but I have found that it works well when operationalized in the classroom; it forms the basis of my own pedagogy.

and outside of the Academy. To demonstrate how pragmatic feminist empiricism operates to link the classroom to spheres outside the classroom, I will provide pedagogical strategies I have used in my own teaching, drawing on experiences I have observed in myself as both a researcher, member of the public, and in some ways a layperson²⁹ while teaching English 3820: Scientific Writing. In addition, I will provide examples of lessons and activities that I have used in the classroom to support pragmatic feminist empiricism in helping my students to become more effective, mindful technical communicators who both embody and acknowledge the value of difference inside and outside of our classroom spaces along with samples of their work and reflections on the course.

I will conclude the dissertation with a reiteration of how important technical communication is as a rhetorically powerful tool for knowledge- and meaning-making in medicine. This is why pragmatic feminist empiricism is important—why the work I do is important. When we observe the physical body, when we seek to help and do no harm, the translation of our bodies into representations from numbers, data, and language becomes technical communication that can play a critical role in preserving the bodies that we have.

²⁹ As an instructor of English 3820: Scientific Writing, I am trained in Rhetoric, Writing, and Professional Communication, while all of my students are Biology/Biomedical Sciences majors. For this reason, I consider myself a layperson at some points in the semester—their fields of expertise are different than my own. Based on a community of practice model, however, I find that by the end of the semester my students and I have all contributed specialized knowledge to our community, thus I feel more enculturated into their disciplines, as they are in mine, which helps us grow both individually and as a learning community.

CHAPTER TWO

Identifying Centric Epistemology and Power to Theorize and Necessitate Pragmatic

Feminist Empiricism

In Chapter I, I identify the move toward universal definitions of health and disease as creating health risks for all individuals, including those who embody characteristics upon which standardized definitions are based. For this reason, I propose pragmatic feminist empiricism as a necessary methodology for developing technical communications³⁰—namely visual communications—in medicine in order to provide more inclusive definitions of health and disease. Pragmatic feminist empiricism aims to recognize embodiment as a site of power and describe how that power works in defining health and disease through three tenets which allow the technical communicator to acknowledge their own embodiments, acknowledge the embodiments of those who are represented and served by the technical communication, and to consider the multiple aims the inquiry may serve. Following Chapter I’s introduction to pragmatic feminist empiricism and the role of technical communication in shaping health and medical discourses, Chapter II will further explicate how pragmatic feminist empiricism can operate in technical communication to challenge past and current discourses about bodies. This chapter will also articulate the historical relationship between epistemology and power in medicine—a relationship that necessitates rhetorical intervention.

Pragmatic feminist empiricism as a methodology works to promote rhetorical awareness for technical communicators in creating more inclusive definitions of health and disease.

Embodiment, I argue, facilitates the development of epistemology, or ways of knowing, that may create biases which impact technical communications and the discourses that result. The

³⁰ I use the singular form of “technical communication” without a qualifier (e.g. “technical communication artifact”) throughout this chapter in reference to the discipline. In using the plural form, I am referring to artifacts of technical communication.

methodology works to call into question through the acknowledgement of embodiments what I call *centric epistemologies*, or ways of knowing that privilege the knowledge- and meaning-making power of one type of embodiment over others. Pragmatic feminist empiricism values multiple epistemologies in formulating the most inclusive definitions of health and disease.

The three provisions of pragmatic feminist empiricism, discussed in greater detail later in this chapter, require that the technical communicator 1) acknowledge one's own embodiments to inform the creation, reflection, and transformation of medical discourse; 2) acknowledge differences in the embodiments that are both represented and served by medicine; 3) consider the multiple aims inquiry may serve and their impact in both private and public spheres. Although the provisions may be considered in any order, I personally feel that in developing technical communication artifacts, rhetorical awareness comes first from within; thus, the acknowledgement of one's own embodiment yields the acknowledgment of biases which, as I point out in Chapter I, both inform one another. One's own realization of self, then, yields the ability to identify characteristics of the embodiments of others, which will differ greatly from one individual to the next.

While the first and second provisions focus on acknowledging the role of embodiment in the process of designing technical communication artifacts, the third provision is perhaps the most valuable or at least the most distinguishing feature in that it urges technical communicators to critically engage with their work beyond its creation. Ridolfo and DeVoss (2009) use the term *rhetorical velocity*³¹ to describe this phenomenon of looking ahead to consider future interpretations and future impacts of composition, which also applies to technical communication. The technical communicator-as-rhetor, I argue, should consider rhetorical

³¹ Rhetorical velocity is "the strategic theorizing for how a text might be recomposed (and why it might be recomposed) by third parties, and how this recomposing may be useful or not to the short- or long-term rhetorical objectives of the rhetorician" (Ridolfo & DeVoss, 2009).

velocity during the design or composing process in order to effectively and ethically craft technical communications that create discourses of health and disease. As a rhetorician, I find the recognition of rhetorical velocity important and part of an audience-centered approach; therefore, I want to highlight the importance of not only identifying a primary audience, but secondary and tertiary audiences through directing technical communicators to consider the multiple aims inquiry may serve. The addition of the term *pragmatic*, then, situates technical communication as rhetorical in its power to create, reflect, and transform discourses about bodies through purpose and audience-driven consideration in the design process.

Looking ahead at possible implications of a technical communication artifact for future interpretations may help technical communicators to move past its initial purpose to realize new potential uses or interpretations that may result in discourses of empowerment and disempowerment. When Leonardo da Vinci, for example, developed an underwater breathing apparatus, he had only the purpose of exploring what was under the water; however, in his *Codex Leicester*,³² he writes that he did not reveal its design because he was aware that the apparatus may be used for inflicting violence as a tool of war. In a more specific example, for medical technical communicators who design models of bodies for the study of anatomy, the choices in representation may communicate to students certain aspects of health and disease that will go much further than the classroom: what the students learn in the study of one model may be applied in various clinical practices, where the model's accuracy may affect the way care is given to a patient or inform future research about bodies.

I have developed pragmatic feminist empiricism as a methodology for technical communications in medicine that recognizes discourse about bodies as living discourses. While

³² Written 1508-1510, the *Codex Leicester* is a 72-page manuscript written in ink by Leonardo da Vinci that describes many of the artist's inventions, designs, and theories about the world. The manuscript is owned by the Bill Gates Foundation (NCMA, 2015).

all discourses are in flux, I use the phrase *living discourses* to refer to the ways in which medical discourses—like the bodies from which they derive meaning and simultaneously are created to serve—have the potential to grow and change with new discoveries in research and new ways of knowing. As in many fields, however, when foundational knowledge has remained unchanged or unchallenged for too long, it is much harder to transform a discourse without altering the society in which the discourse is produced and reproduced over time. Technical communicators, when they exercise pragmatic feminist empiricism, have the opportunity to allow discourses of health and disease to continue to grow and change—to be living discourses--in considering how technical communications may be interpreted and used in developing future knowledge.

With regard to seeking knowledge, Campbell (1994) critiques traditional feminist empiricism as being rooted in positivism³³ and acting through the existence of a realist objectivity:³⁴ pragmatic feminist empiricism as a methodology acknowledges the value of collecting data and interpreting data in seeking new knowledge, but also acknowledges the inevitable role of biases as positive or negative forces in shaping and impacting discourses about embodiment. This is the influence of post-modern feminism that I mention in Chapter I—the notion that social constructs play a part in establishing value and may result from bias in the design process.

I offer pragmatic feminist empiricism primarily to technical communicators developing visual models of bodies in medical fields. While pragmatic feminist empiricism is aimed at those in medical fields, the methodology serves all who are served by medicine. I argue that all individuals are served by medicine and science in that public health issues affect all of humanity.

³³ Positivism, developed by Auguste Comte, is the belief in philosophy that the only true knowledge one can have about the world must be made through scientific testing in the natural world, where any other sites of knowledge such as experience or theory are not trustworthy (Hasan, 2016).

³⁴ The phrase “realist objectivity” refers to the notion of existence—that a state of objectivity, or non-biased truth, exists and may be obtained (Dunaway, 2014).

The CDC Foundation (2016) recognizes that public health is meant to serve “entire populations” through research. This is to say that the reach of pragmatic feminist empiricism as a methodology for technical communicators working in medical fields is vast and serves to acknowledge diverse embodiments.

While it is difficult to acknowledge each individual embodiment that is served by medical research and equally difficult to represent each individual embodiment in technical communication, it is possible to acknowledge that there are differences in embodiments which may impact the ways that medical professionals learn from and approach bodily data that has been embodied in technical communications. Technical communicators, then, have a very important role to play in ensuring that differences in embodiments between themselves and in others are acknowledged during the design process and that their work may serve multiple inquiries—including the creation of more inclusive definitions of health and disease. Pragmatic feminist empiricism as a methodology for technical communication will help technical communicators to approach design of medical models that represent the body with care and with the knowledge that their models could empower and disempower certain embodiments by setting precedents for future knowledge.

In continuing to explicate the need for pragmatic feminist empiricism as a methodology and the operation of rhetorical and social power in medicine that I discuss in Chapter I, this chapter will use an historical approach to trace relevant origins of epistemology and power in the medical field. Furthermore, Chapter II will demonstrate how technical communication creates, reflects, and transforms discourse and illustrate how power is obtained, exerted, and shifted to impact public health. Finally, Chapter II will further draw out pragmatic feminist empiricism and

offer examples of how I intend to embody pragmatic feminist empiricism in my research toward the ends I have described in relation to creating more inclusive definitions of health and disease.

Acquiring Epistemology through Embodiment in the Institutionalization of Medicine

The primary goal of pragmatic feminist empiricism is to create awareness of embodiments and question the impact of embodiments on technical communications concerning the development of definitions of health and disease. In Chapter I, I discuss the role of embodiment as how we come to know and make meaning of the world around us. Epistemology, I argue, is directly tied to embodiment in that features of embodiments give individuals access to the world and to the inner self. Certain embodiments are privileged in particular social, cultural, or institutional contexts and may influence discourse. This means that, in turn, epistemologies become empowered through embodiments. This is why the first two tenets of pragmatic feminist empiricism are so important—they call both the embodiments of the technical communicator and the constituents of that technical communication forward and acknowledge their existence. Acknowledging embodiments is acknowledging epistemologies and asking, through the third tenet of identifying other aims inquiry may serve, how valued epistemologies that are reflected through the discourse produced in technical communications impact the public in positive and negative ways.

The androcentric view of bodies and bodily systems upon which knowledge was grounded in medical and scientific fields is very much alive today, though not in the sense that many scientific discourses are actually discourses which are open to change and growth. I argue that discourses defining health and disease are stymied by moves toward standardization, which I will discuss later in the chapter. The early epistemologies that informed the collection of data through experimentation resulted from the embodiments of individuals who had access to power.

Before I discuss the role of power, however, in further necessitating the need for pragmatic feminist empiricism as an intervention tool, it is necessary to review how epistemologies informed medical and scientific fields and led to the institutionalization of medicine.

Instead of beginning with ancient medical texts of figures such as Metrodora,³⁵ Alcmaeon,³⁶ or Galen,³⁷ I locate the foundation of modern medicine³⁸ as an institution beginning in the seventeenth century, a time when many of the principles that guided the institutionalization of medicine were grounded in philosophical treatises on epistemology, embodiment, and technology. These principles created widely accepted medical discourse that would be spread through publication and adopted as part of curricula in scientific institutions. To this end, I shall begin with a discussion of philosophy and its role in establishing parameters for what constitutes “fact” or “truth” to inform natural order—a discussion that begins with Cartesian dualism.

Cartesian dualism, expressed in the 1641 *Meditations on First Philosophy*, establishes the relationship between embodiment and epistemology through the separation of mind and body—a clearly different line of reasoning than the logic of pragmatic feminist empiricism. Nonetheless, Descartes posited that body and mind could exist independently from one another—that the bodily system is governed by the mind’s ability to move its parts. In the *Meditations*, Descartes

³⁵ Metrodora (Cleopatra Metrodora) of Athens, Greece was the first woman medical writer as well as a physician, surgeon, and midwife specializing in gynecological medicine whose work went unknown and unacknowledged for centuries (Furst, 1997; Zillborg & Gall, 1997; Tsoucalas, Karamanou, & Georgios, 2013).

³⁶ Alcmaeon of Croton was one of the only pre-Hippocratic physicians whose medical theories endured. He is sometimes referred to as the “Father of Anatomy” and “Father of Physiology” and is cited by Theophrastus in his *Physical Opinions* (Longrigg, 2013).

³⁷ Galen of Pergamum was a physician, surgeon, and proponent of humoral medicine. His theories of anatomy and pathology were used as the basis of medical practice for over 1300 years (Bynum, 2008).

³⁸ The “modern medicine” I refer to and discuss throughout this section concerns developments leading to the institutionalization of Western medicine, which is the primary focus of my research. During the seventeenth centuries and following, medical practices in the far East were also experiencing growth and change, which is important to acknowledge. For further reading on medical developments in the East and a comparative history of Western and Eastern traditions, see Unschuld’s *What is Medicine? Western and Eastern Approaches to Healing* (2009).

uses the experience of dreaming to justify the separation of the physical and material, which is accessed through the senses, yet during sleep is simulated through the mind. This separation of mind and body led to Descartes reasoning that an objective truth may be obtained. For Descartes, the body served as a vehicle for empirical observation through the senses and was necessary for epistemology, yet sensory observation lies and is reserved for childish experience of the world (Garber, 2001). Only through reason and logic can truth be obtained—an objective truth devoid of influence of the sensory and imagination. According to Aristotle’s physics, which Descartes rejected, bodies were destined to behave a certain way based on their substance.³⁹ Sensing alone did not yield truth for Descartes. In *Meditation II*, Descartes illustrates the faulty nature of senses through the study of the properties of a piece of wax and its changing form—a form which can be visibly observed as changing or bearing certain properties, but a material with a composition that is inaccessible to the senses alone and must be defined through reason in order to yield true knowledge of its substance.

Cartesian dualism, then, which privileged reason and doubted the body, became part of the foundation of epistemological reason that would govern experimental science, where the difference between a theory and a fact would be made through reason and higher order thinking. Bias, according to Descartes, was a negative attribute for the experimenter to exhibit and could be eliminated. Any theory would be tested through experimentation where, after careful deductive reasoning, certain unchanging observations would yield knowledge—knowledge that did not prejudice the senses but was natural truth and certainty made valid through repeated experimentation. In addition to the separation of mind and body as a challenge to Aristotelian

³⁹ The “substance” here refers to humoral medicine, which was based on belief that the body was composed of four substances (blood, phlegm, yellow bile, black bile) that must be kept in balance. Imbalances in any substances were believed to cause disease.

Scholasticism,⁴⁰ Descartes also rejected Aristotelian models of the body, likening the human body to a machine—particularly, a clock: “...the human body may be considered as a machine so built and composed of bones, nerves, muscles, veins, blood and skin that even if there were no mind in it, it would not cease to move in all the ways it does at present when it is not moved under the direction of the will” (Descartes, 1990). The body, then, according to Cartesian principles, is a technological system.

For modern medicine as an institution, the standardization of practices in experimental science through the separation of body and mind and higher order thinking to establish fact – namely, the privileging of the mind over body—may largely be attributed to Cartesian dualism. The influence of Cartesian dualism in the formulation of an experimental method, exemplified in his study of the formation of the rainbow,⁴¹ led to the development of experimental methods, which, though differing in their focus on the individual as experimenter, would lead later to Francis Bacon’s own published methods of experimentation⁴² as a social and community endeavor in his House of Saloman,⁴³ a predecessor to the Royal Society⁴⁴ in London, which still endures today.

In addition to contributing to institutionalizing experimental science, the body-as-machine model that Descartes offered impacted the growth of new medical interests in the body, new knowledge- and meaning-making possibilities, and the development of imaging

⁴⁰ Aristotelian Scholasticism refers to Aristotelian physics in this sense, that “natural philosophy is ultimately grounded in the irreducible tendencies bodies have to behave one way or another, as embodied in their substantial forms” (Garber, 2001, p. 2).

⁴¹ See *Discours de la Méthode* (1637).

⁴² Bacon employed 36 experimenters in his laboratory, and each investigator conducted experiments, but none attempted to replicate—the acceptance of one investigator’s findings were grounds enough for truth (Galison, 2011).

⁴³ House of Saloman was Bacon’s imagined laboratory in his 1627 work *New Atlantis and The Great Instauration*, which became the basis for the Royal Society.

⁴⁴ The Royal Society is a national academy and fellowship of scientists founded in 1660 in London that endures today—publishing works by scientists and providing grants and awards for research (Royal Society, 2016).

technologies such as the microscope in the seventeenth century. Observation as epistemology and systematic framing of the body-as-machine would help to streamline the way bodies were studied—ways that embodied the epistemologies and values of those who studied them.

The model of the body-as-machine supported the notion that all bodies must work in the same way—they are machines with parts that function in a standard way. Unlike the individualized approach to health in the days of Hippocratic humoral medicine that recognized unique balances of substances in bodies, modern medicine reasoned that health, disease, and treatment could be defined one way and applied to all bodies. Through Cartesian dualism, which relies on higher ordered thinking, certain truths about bodies were accepted as fact and laid the groundwork for future studies. Bacon himself noted that “when you know one, you know all” (Galison, 2011, p. 324). The late seventeenth and early eighteenth centuries became known as the Age of Enlightenment, a time in which scientific discovery and standardization flourished. With Cartesian reasoning and the growing institutionalization of medicine, doctors in the eighteenth century and following continued to organize and develop standard methods for knowing the body⁴⁵—standards based on the values and embodied epistemologies of those who had access to power and were allowed to contribute in the early beginnings of modern medicine.

In the time that Descartes was developing treatises on epistemology and formulating dualism as a means of separating truth and feeling, there was no need for him or any other philosopher working at the time to acknowledge his own embodiments. This is because the accepted social order gave individuals like Descartes access to social, cultural, and institutional capital—through embodied features of sex, gender, race, class, and education. In France, the

⁴⁵ I use the singular form strategically here to illustrate how modern medicine was theorized based on a standard, white-European, male body.

Académie des Sciences⁴⁶ consisted of a group of philosophers—all white-European men—who worked together as part of the French government to form the foundations of institutionalized scientific knowledge. Women were not allowed full membership until 1979.⁴⁷ The Royal Society in London invited women to join in 1944—again, after much of the body of knowledge that formed medical understanding and standardized healthcare regarding disease definitions and treatments had already been accepted as universal truths about bodies for centuries. During the height of the slave trade, scientific racism⁴⁸ through reasoning based on agreed-upon “facts” regarding the body classified individuals into certain races based on physical attributes and marked them as being deviant from the norm and possibly posing threats to health of the status quo, justifying race as grounds for disempowerment, ill treatment, punishment.

To call the institutionalization of science and medicine founded on an androcentric ideal is really only partially true—the view was white-European androcentric, to be sure. The power of whiteness in establishing and controlling medical discourses spread through institutionalization from Europe to the Americas. In the Americas, slave plantations in the 1800s became sites of medical experimentation. The development of the Sims speculum and the treatment of fistulas, for example, were the result of experiments conducted by Dr. J. Marion Sims—gruesome surgical experiments conducted on three women in particular named Anarcha, Betsey, and Lucy (Kuppers, 2008; Sims, 1886). While Sims is heralded as the “Father of Gynecology” in many texts detailing his life and experimentation, Anarcha, Betsey, and Lucy are not named as mothers

⁴⁶ The Académie des Sciences was founded in 1666 as a branch of the French government in order to provide impartial scientific recommendations and was established under the rule of Louis XIV. Jean-Baptiste Colbert, who urged the king to institute the Academy, was an avid admirer of Descartes (Crosland, 1992).

⁴⁷ As an exception to membership rules regarding the entry of women, Marie Curie was an exception of membership to the Academy. Other women who followed were only given partial membership in 1962 (Crosland, 1992).

⁴⁸ Scientific racism refers to the invocation of biological science to promote inequality based on race (Wade, 2015). Though a rise of scientific racism is evidenced in the histories of slave trade particularly in the eighteenth century, scientific racism has endured. In the 1980s and early 1990s, for example, scientific racism was prevalent in the epidemiological study of AIDS transmission (Leslie, 1990).

of the discipline—following the white, androcentric underpinnings of the disciplines, it is the literate and white Dr. Sims whose written account and “contribution” has endured. Anarcha, Betsey, and Lucy’s embodiments were constructed through scientific racism—their bodies objectified and subjected to surgeries conducted without anesthesia, then silenced with drugs to muffle their cries of pain.

While scientific racism that objectified the embodiments of non-white races and ethnicities in developing foundations without acknowledgment during the nineteenth century and later, social and cultural customs within seventeenth and eighteenth white-European life also played a significant role in inhibiting the study of white-European women’s bodies. Actual study of women’s bodies was limited, and most women were afforded little or no access to studying philosophy, science, and medicine—thus, they did not have the tools to contribute their embodied knowledge to medicine. In studying women’s bodies, male experimenters would ground findings based on standards of experiments done on the white-European male body—the standard body. The androcentric view of medicine and institutionalization of medical belief was inevitable, as the experimental science revolution was governed by men, from the origination of epistemological theory in Descartes to experimental methods. Women’s roles were located in the private or household sphere, while men controlled governance and public policy. Under a patriarchal system, those in power had the most access to knowledge and control of the discourse—all because of their embodiment. The irony of Cartesian dualism and privileging the mind over the body is that the epistemologies which informed experimental science and governed the acceptance of truths and standards of bodily health and disease were in fact completely influenced by embodiment—the male body that was empowered through discourse and language. For the men who formed the Royal Society, for example, theories were deemed

valid and accepted as truths or facts when experimental results could be replicated by different hands working in the laboratory; however, these hands all belonged to white-European men, who often experimented on themselves to test theories about disease.⁴⁹ According to Dear (2009), once observations were accepted as facts in Bacon's lab, they were not tested again.⁵⁰ The notion of scientific fact was a social institution run by a single embodiment and single epistemology of those who were privileged through their embodiment.

In the history of medicine as an institution—the founding of scientific academies, experimental methods, hospitals, etc.—white men were the ones who observed and represented scientific and medical standards. They were men enculturated into medicine through the use of artifacts and through education developed through experimentation. They were both products and embodiments of the research they presented and practiced, and had no need to question what they accepted as truth as long as they were in control. Through their acquisition of power through embodiment, they were able to create discourses of medicine that would inform its institutionalization—discourses that would take centuries to even begin to change and that still retain significant power today.

Embodied Power in Creating, Reflecting, and Transmitting Dominant Discourses

While the previous section focused on the role of embodiment in shaping epistemology from a historical point of view, this section will discuss embodiment in terms of empowerment and disempowerment and the creation, reflection, and transmission of discourse. Through

⁴⁹ In the seventeenth century particularly during the height of the scientific revolution, investigators would often experiment on themselves, further creating “facts” that embodied their identities and would reflect features of their embodiments.

⁵⁰ According to Galison (2011), Thomas Sprat would require that experiments be replicated between members of the laboratory in the Royal Society in 1667—an improvement upon Bacon's idea that initial experiment results conducted by one inspector were enough to constitute fact.

embodiment, the epistemologies of those in power were the source of knowledge- and meaning-making for the populations they dominated.

But how is power acquired for certain embodiments and dispersed for others? How did the founders successfully institutionalize modern medicine and influence how health and disease are defined? As I have shown, social and cultural capital allowed individuals occupying certain embodiments to gain power and influence. Once practices were agreed upon in medicine, institutional capital—an affiliate of social capital—would then give those in power even more authority in governing how bodies of constituents of public health were defined or regulated. While the embodiments gave them power, it privileged their epistemologies, their experiences and observations, and their discourse. Empowerment is not, however, transmitted through an individual's influence—empowerment comes through the influence of community.

Even if one makes the argument, for example, that Descartes was the founder of modern science, part of the narrative is incomplete because he could not have simply spoken Cartesian dualism into the air and let it gain acceptance on its own. Descartes was part of a community of philosophers—of a community of individuals who shared his passion for science, but whose embodiments also allowed them social, cultural, and institutional capital to both listen and share his discourse. Through mutual agreement and networking, Cartesian dualism gained acceptance and became part of scientific discourse through its transmission.

To trace the acquisition of power and influence to certain embodiments, it is useful to begin with a discussion of how communities form. Lave and Wenger's (1991) community of practice model, which I discuss in Chapter I, explains community development well. Communities of practice rely on shared value, language, and technology in order to achieve goals. So for groups to form an identity, members must embody similar features. Though the

community of practice model was developed to apply to professional groups, I argue that its tenets apply to the formation of any group with a goal. For Descartes and other philosophers, shared values came in their embodiments of social and cultural identity, language in their use of Latin and specialized terminology, and literacy⁵¹ as technology.

Empowerment does not come from the development of a single, cohesive community alone. Empowerment is the result of cross-community interaction that leads to a network of communities that share similar identities. As for the case of white-European men who institutionalized modern medicine, its philosophical founders were able to share ideas across their communities into specialized communities through language and literacy—a result of their embodiments formed from social, cultural, and institutional capital, that were similar to those of other communities. The sources of their social, cultural, and institutional could be traced similarly to embodied traits of ruling classes who gained political power through conquest, which also began with the formation of a community.

With privileged embodiment of the status quo, and no successful challenges to the status quo based on the power of the ruling classes, there was again no need for intellectuals in science to acknowledge their embodiments in communicating with one another and questioning whether their epistemologies were fit for determining what was a natural law of the body in medicine. With their own embodiments as models and standards for health and disease, because their embodiments were like those in power, their findings were accepted as facts and their discourses unquestioned.

⁵¹ When I use the term *literacy*, I am referring to the traditional sense of the word which encompasses both reading and writing. I would argue that literacies differ from one community to another based on the language s they use. For Descartes and the philosophical community, for example, literacy as a technology would include the mastery of reading and writing in Latin in addition to arithmetic.

Discourse, then, produced from cross-community interactions, is likewise created and reflected through embodiments. While discourses seemingly appear to be much alive in that they are produced through interaction, health and disease discourses are, in fact, not living at all in that they match the centric epistemologies of those who produced them and had no reason to question them. Medical discourse, created by individuals with privileged, empowered embodiments, is a reflection of the experiences, observations, and beliefs of those who have power and influence in a society. With the advent of Gutenberg's printing press in 1440, medical discourses in the seventeenth century—which embodied their creators without acknowledging embodiment—could spread easily through mass communication from one academic circle to another. Those who were literate—who knew Latin—could understand and accept ideas as facts. Publications had further reach than one's own academy. Published findings could travel worldwide at a quicker speed via the technology of the printing press. For students in the academy (who also embodied features of the status quo) studying medicine, textbooks created via the printing press helped to share accepted discourses, helping to further the institutionalization of medicine. Institutionalized medicine would train professionals to observe through the eyes of their predecessors—to learn to see through their own eyes, but through someone else's spectacles.

The Three Tenets of Pragmatic Feminist Empiricism

While thus far Chapter II has briefly summarized the tenets of pragmatic feminist empiricism and outlined the role of epistemological development in the institutionalization of medicine through an examination of medicine's standardization, the next three sections will further draw out the tenets of pragmatic feminist empiricism. This section will pick up with a discussion of the first tenet—explaining how and why it is important for the technical

communicator to identify her own embodiment when representing bodies. I will conclude each discussion of tenets of pragmatic feminist empiricism with a brief statement regarding my own practice of each tenet in the dissertation in order to embody the methodology I am outlining. The infinity symbol will separate my embodiment of the respective tenet from the description of the tenet—though I do this not to suggest such a separation can be truly accomplished, but rather to provide an additional layer of reflection about the development of this dissertation while simultaneously providing examples of pragmatic feminist empiricism in practice. I choose the infinity symbol because it symbolizes the infinite possibilities that feminist inquiry may provide for medical disciplines and for its visual similarity to the Mobius strip, which Grosz (1994) uses as a metaphor for embodiment and the interconnected relationship between the outside world and the inner workings of the individual.

Tenet 1: Acknowledging the Technical Communicator's Own Embodiment

The first tenet of pragmatic feminist empiricism requires that the technical communicator should not necessarily disclose biases, but be aware of them and the impact that they may have on interpreting data that will construct the artifact of technical communication. Siegfried (2002) in “Shedding Skins” cites Sullivan’s notions of the importance of recognizing embodiment:

Shannon Sullivan (2001) emphasizes the permeability of skins, which connect with, and allow movement between, inner and outer worlds. In this sense, skin is not a metaphor for concealment. Instead of pointing out how we should shed our skins, she urges us to live in and through them. But as she also affirms, both are necessary” (p. 174).

What Siegfried highlights in referencing Sullivan is that embodiment is not only a medium through which one accesses the world, but through which one experiences the world. This experience of the world is cannot occur only through the mind, but must occur through the body

in the world. For technical communicators, self-actualization of embodiments acknowledges this notion of the body as both medium and mediated. To make this connection, the technical communicator must engage in a dialogue of the self. The technical communicator may ask the following questions, for example, in acknowledgement of her own embodiments:

- How do the personal and professional attributes I embody—attributes shaped through social, cultural, and institutional factors that comprise my overall identity—influence the way I communicate?
- How do my personal attributes (e.g. sex, gender, race, age) impact communication in and across my profession?
- How do my professional attributes (e.g. education, titles, preferred genres, jargon) impact communication in and across my profession?

The questions I suggest in acknowledging the technical communicator's own embodiment urge the technical communicator to think about her own identity as rhetorical. Contextually, the influence of personal and professional attributes may change, but within the individual, the collective embodiments of both personal and professional attributes inform the overall identity⁵² of the technical communicator, forming her ethos to represent human bodies as technical communications in and across her field. Other elements of the technical communicator's identity may be sources of logos that inform her approach to the development of technical communications that represent human bodies, in addition to the ability to appeal to certain ideas of pathos that might be acceptable to those who share some attributes of her embodiment.

⁵² I use the term "identity" to refer to the collective embodiments an individual such as social or personal embodiments (e.g. middle-class, certain age demographic) and professional embodiments (e.g. hospital manager, executive assistant) that apply to the individual.

Though technical communication is professional communication, I argue that personal attributes are equally as important in that they inform one's perceptions of the profession and shape the way that they situate themselves as part of the profession. In some cases, personal attributes may impact one's entry or access to the profession. For example, in "Gender and Modes of Collaboration in a Chemical Engineering Design Course," Flynn, Savage, Penti, Brown and Watke (1991) cite a study conducted by Carter and Kirkup of how women in engineering professions are impacted by the androcentric effects of the discipline. The findings of the study noted that women in the field could benefit from what they learned professionally, but "there were drawbacks in terms of the stress of maintaining both a professional identity and a private life. They also found that the engineering workplace is constituted by all-pervasive male values" (p. 447). The women in the study noted that male students perceived their female embodiments as threats to their own environment. These perceptions are based on traditional gender beliefs regarding the woman as constituting a subversive role more relegated to assistant-type roles as opposed to leadership roles. In this example, the women who experienced discrimination in the classroom would view their entry into the profession differently from men. Their embodiments would inform their positions in the field. The personal does shape the professional, and vice versa, though when it comes to technical communication in a professional field one cannot ignore the fact that many attributes of the profession are embodied not by choice but through the influence of economic capital (i.e. monetary compensation) that requires one to embody and adopt attributes in order to be part of the profession.

Fountain (2014) writes in *Rhetoric in the Flesh* that "To understand how someone become socialized to see objects and people by way of the frameworks provided by a profession, we also must take into account the rhetorical discourses that structure those objects, displays,

documents, and practices” (p. 23). This is to say that the professional learns to view medical research through enculturation⁵³ into the discipline—a process in which the professional embodies the role of expert in her discipline. The embodiment of expert in a given field is directly influenced by institutional means: the medical professional achieves certification in a program of study, may be given a title, and may be required to publish materials to build and sustain ethos. This institutional ethos is embodied and may as a terministic screen for both the professional in how she self-identifies as a professional and for those with whom she interacts (i.e. members of the public and other professionals in and across the discipline). As I mentioned in the previous section, discourses formed from the epistemologies of founders of modern medicine are embodied in the language, practices, and artifacts in the discipline.

The main point I want to stress here is that the technical communicator, in acknowledging her own embodiments, begins to identify her power as a rhetor. Through careful self-examination, she begins to reveal her own biases and recognize the potential influence that her biases—both personal and professional—may have on the development of technical communications and in the creation of discourse about bodies. The recognition of these characteristics and their potential to create, reflect, and transform discourse may help the technical communicator to exercise care and consideration when developing representations of human bodies to define health and disease.

⁵³ In using the term “enculturation,” I am referring to the process where an individual learns the key terms, expectations, and other elements of the discipline or other context in order to become a part of that community. Enculturation may happen in a variety of ways. For example, Lave and Wenger (1991) discuss enculturation as part of a situated learning model, where “situated learning” refers to an apprentice-style introduction of an aspiring professional into a community of practice where skills in language, value, and technology are shared from senior members and practiced through experience.



In Chapters III and IV, I will be using pragmatic feminist empiricism to investigate the representation of bodies through anatomical sex. I chose this site of analysis based on my embodiment as a woman and feminist working in medical rhetoric. In acknowledging my own embodiments, both personal and professional, I am preparing myself to engage with the purpose of the technical communications that I will examine and produce.

Tenet 2: Acknowledging the Embodiments of Those Who are Both Represented and Served by Technical Communication

As I mentioned in the beginning of the chapter, the first two tenets of pragmatic feminist empiricism may be operationalized interchangeably, but I recommend that the technical communicator begins with self-examination in acknowledging their own embodiments in order to be more rhetorically cognizant of how their embodiments may influence how they acknowledge others. This is similar to Ratcliffe's (2005) concept of rhetorical listening,⁵⁴ where the rhetor must thoroughly immerse herself into the context of the situation in order to fully understand it from all points of view. While Ratcliffe urges the rhetor to erase identification markers (i.e. embodiments) to rhetorically listen and immerse, I argue with pragmatic feminist empiricism that the embodiment of the technical communicator-as-rhetor should allow the individual to acknowledge and use her own identification to contribute positively to the design of technical communications and to call into question discourses that may disempower. To realize the full context and rhetorically listen, the technical communicator must also acknowledge the embodiments of those represented and served by technical communications, identifying

⁵⁴ See Ratcliffe's (2005) *Rhetorical Listening: Identification, Gender, Whiteness*, referenced in Chapter I.

differences between those embodiments to determine the best way to represent bodies in creating and reflecting inclusive definitions of health and disease.

The acknowledgement of differences in embodiments—whether they are differences from the embodiments of the technical communicator or differences between the embodiments of those who are represented and served by technical communications—is an exercise in feminist inquiry in that the differences, once they are identified, are collected and examined to inform the design of the artifact of technical communication. To put the second tenet of pragmatic feminist empiricism into practice, the technical communicator might ask the following questions to acknowledge the embodiments of others:

- What embodiments do I observe in the bodies that are represented and served by the artifact of technical communication?
- How do the embodiments of those I am representing differ from one another and from my own?
- In representing these embodiments, how can I ensure that the artifact of technical communication creates discourse that benefits these embodiments?
- What responses might be elicited from individuals whose embodiments I represent and construct through technical communication?

Though the list of questions I provide is not exhaustive in acknowledging embodiments outside of the self, the suggestions aid the technical communicator in engaging rhetorically to identify features of embodiments that may be rhetorically impacted by technical communications. This is to say that to represent embodiments effectively, the technical communicator must take into account what constitutes these embodiments and what features that are highlighted may yield discourse that are conducive to the purpose of the artifact of technical communication.

For example, if a technical communicator is illustrating the effects of smoking in increasing lung cancer risks through an infographic designed for respiratory therapists, acknowledging the embodiments of smoking individuals is important to the design of the infographic to make sure that visual clearly shows that the effects of smoking affect all types of embodiments—embodiments of individuals of all sexes, genders, races, and ages. In addition, the technical communicator might also pay careful attention to other features of embodiment in designing the visual such as social and cultural attributes. Examples of social or cultural attributes may include dress or other features that may label bodies as belonging to various classes or ethnicities. Representations may portray the typical smoker as occupying specific types of embodiments when, in fact, smoking raises risks of lung cancer in all embodiments (CDC, “Lung Cancer,” 2016). If the technical communicator does not acknowledge the embodiments of those represented or served by the technical communicator, she creates a visual that reflects discourses stemming from her own personal and professional embodiment—which could either be positive for those who are represented and served by technical communications or negative, depending on how inclusive her own embodiment may be regarding the purpose and contexts of the technical communications.

In acknowledging the differences between embodiments and her own, the technical communicator takes an agential approach to identifying rhetorical power in the design of the technical communication. Cooper (2011) writes that “Conceiving of agency in this way enables writers to recognize their rhetorical acts, whether conscious or nonconscious, as acts that make them who they are, that affect others, and that can contribute to the common good. Responsible rhetorical agency entails being open to and responsive to the meanings of concrete others, and thus seeing persuasion as an invitation to listeners as also always agents in persuasion” (p.

420). This is to say that the technical communicator-as-rhetor identifies herself and those who she seeks to represent and serve, which may be put into conversation. This process is similar to Royster's (2000) notion of critical imagination⁵⁵ where "imagination functions as a critical skill in questioning a view point, an experience, an event, and so on, and in remaking interpretive frameworks based on that questioning" (p. 83). In my adaptation of the definition, the rhetor envisions the agents involved in the process of developing the technical communication and how they might engage with technical communication about their bodies. Royster (2000) also notes that "Critical imagination doesn't relieve the research from doing good or careful work; rather, it acknowledges the difficulty of making grand claims about Truth without overstepping the bounds of possibility (p. 84). Royster's idea of critical imagination is useful for the technical communicator-as-rhetor in that consideration of the central subjects of the work—those who are represented and served—should be acknowledged during the design process in order to create more rhetorically responsible technical communication that considers the rhetorical impact representation of their bodies might have on them and for them.

Once the technical communicator-as-rhetor has engaged in critical imagination regarding the agents in the design process of the technical communication, she must then engage in an imagined dialogue to question the rhetorical implications of the embodiments at work in the creative process. This is the practice of Royster and Kirsch's (2012) concept of strategic contemplation⁵⁶ which is described as "engaging in a dialogue, in an exchange, with the women who are our rhetorical subjects, even if only imaginatively, to understand their words, their visions, their priorities whether and perhaps especially when they differ from our own" (p. 21). I adapt this concept for pragmatic feminist empiricism, where differences are acknowledged

⁵⁵ See Royster's (2000) *Traces of a Stream*, referenced in Chapter I.

⁵⁶ See Royster and Kirsch's (2012) *Feminist Rhetorical Practices: New Horizons for Rhetoric, Composition, and Literacy Studies*, referenced in Chapter I.

between *all* embodiments represented and served, and between those embodiments and the technical communicator. The benefit of strategic contemplation is that in imagining a dialogue and asking questions about differences, the technical communicator will be able to approach the design of technical communication to develop more inclusive representations.

In theorizing pragmatic feminist empiricism as a methodology, it is beneficial to demonstrate the use critical imagination and strategic contemplation as they operate in the design of technical communication to create more inclusivity. Recent updates to medical coding for diseases and conditions are one example of a current development in medical technical communication using critical imagination and strategic contemplation to acknowledge differences. The International Statistical Classification of Diseases and Related Health Problems, Clinical Modification, or ICD-CM, is a coding system instituted through the World Health Organization (WHO) that recently moved from its ninth revision (ICD-9-CM), created in 1979, to its tenth revision (ICD-10-CM), which went into complete use in October of 2015 (Centers for Medicaid and Medicaid Services, 2015). In a clinical encounter with a medical provider following implementation of ICD-10-CM, I observed in my records that the codes for a specific condition had changed. When I questioned the change, the provider explained that ICD-10-CM is completely different than ICD-9-CM and is making the process of coding diseases for treatment and insurance purposes very difficult. According to the WHO (2016), under ICD-9-CM, there were 14,000 codes for diseases that would be used for billing and clinical epidemiological studies, in addition to clinical record keeping. The ICD-10-CM system codes diseases more specifically, which creates more codes—69,000 at this time (WHO, 2016). For example, if a patient is experiencing edema on one side of the body, instead of coding for edema in say, the ankle, ICD-9-CM would only code for the condition, the location, and the severity.

ICD-10-CM, on the other hand, would code for the condition, the location, severity, and which ankle (right or left), in addition to other codes for specificity.

In my encounter, the provider told me he was frustrated with the new system— that the new system took up more time during clinical visits. While it did take longer to code during the visit, as I embodied the role of the patient and as a technical communicator myself, I found the new system to be more inclusive. In addition, I was also pleased to know that conditions of diagnosis had also been updated to reflect new findings in medicine since 1979, including changes to disease definitions and the addition of blood types to recordkeeping (CDC, 2015). While inclusion of more specific information in coding is for billing purposes to ensure proper payment for treatment is made, better recordkeeping and more specific data allows for better research in public health issues that would allow a technical communicator to take into account very specific attributes of embodiments when representing conditions. The acknowledgement of differences in embodiments of patients whose data are collected and coded and used for public health research is a step away from the idea that the standardized definitions of health and disease are not without variation and may lead to research that creates even more inclusive definitions through the acknowledgment of differences.

Through acknowledgment of embodiments, the technical communicator can exercise better rhetorical cognizance, using forms of rhetorical listening, critical imagination, and strategic contemplation to acknowledge differences and question the impact these differences may have in creating, reflecting, and transforming medical discourse through technical communication. In acknowledging differences, the technical communicator engages in a rhetorical process of revealing biases and determining how biases will affect the interpretation of the artifact of technical communication for its purpose and its intended audiences.



To prepare for the analyses I will undertake in Chapters III and IV, I acknowledge that there are many embodiments I will be studying in the work. The findings that I will share from the analyses will consider embodiments that are different from my own—including those of varied sexes, genders, races, and ethnicities. I also acknowledge that in communicating about these embodiments, I must take care to ensure that discourses that may be produced from the work I engage in should be inclusive of and beneficial to different embodiments.

Tenet 3: Considering the Multiple Aims Inquiry May Serve in Individual and Public Spheres

To take the rhetorical process of designing technical communication that represents bodies in a way to create inclusive definitions of health and disease, the third tenet of pragmatic feminist empiricism is, as I stated in earlier sections of the chapter, is in some ways the most critical point for technical communicators to take away in putting the methodology into practice. According to Leach and Dysart-Gale (2011), the question of what is valuable in clinical research, for example, will change depending on who is asked—thus what is valued becomes part of the discourse in framing definitions of disease and treatment. The role of inquiry and discourse in public health is influential in how the public understands disease and, ultimately, how the individual learns to understand his or her own body in relation to notions of health and disease. To further support the impact of discourses on the individual, Roberts (2007) cites a study by Martin (1987), noting that findings illustrate “vividly that women’s relation to their bodies are both mediated by—and sometimes resist or subvert—biomedical understandings, which are

themselves deeply culturally infected” (p. 3). This is why consideration of the multiple aims inquiry may serve is so important for both individuals and the public.

The third tenet, the tenet that necessitates the addition of the term *pragmatic* to the methodology, asks the technical communicator to consider how the technical communication will be used and what discourses will result. The purpose of this questioning is for the technical communicator to consider the ways the technical communication will enact meaning and be interpreted for use in the development of future knowledge about bodies that it represents and serves. If the technical communication acts as sites of future knowledge, then accurate representations of bodies are crucial to the potential uses. To consider the potential for the technical communication, the technical communicator may ask the following questions:

- What is the purpose of the artifact of technical communication for the primary audience?
- What are the possibilities for future uses through other interpretations of the artifact of technical communication?
- How might the artifact of technical communication be used or interpreted to add to future knowledge about embodiments?
- What potential does the artifact of technical communication have to create, reflect, or transform discourses about bodies for the private, professional audience and the public?

In the rhetorical situation, the audience is the main consideration of the rhetor. In order to effectively communicate purpose, the rhetor must be able to relate to the audience and understand the contexts of the information. Again, I argue that the technical communicator-as-rhetor must make the connections between purpose and audience, but should also take into consideration that possibility that the technical communication will be used as a basis for future knowledge.

In order to explain more thoroughly the necessity of considering the multiple aims inquiry may serve, consider the historical illustrations of anatomy upon which medicine relied from ancient medicine up until the sixteenth century. Before human dissection was a widespread practice, animals were studied in order to explain the inner workings of the human body. Galenic medicine,⁵⁷ based on humoral medicine, was the foundation of medical belief and practice up until the sixteenth century. Galen illustrated animal vivisections and dissections and published them, basing his understandings of the human body upon his work with animal vivisection and dissection. His understanding of the way the human uterus worked, for example, was based on a pig. Galen's illustrations were not only used to teach physicians how the human body worked, but they would also lead to the development of treatment methods—methods that were sometimes accurate and sometimes completely wrong because his findings from animal vivisection and dissection did not match what would much later be found from the dissection of human bodies.

It is critical, then, to ensure that technical communications are accurate,⁵⁸ as their initial purposes may be re-interpreted and may be used for other purposes, creating new discourses that will be accepted and used as grounds for future knowledge. In medicine, particularly, the design of technical communications must be accurate and create definitions of health and disease that are inclusive. This notion of presenting data that will come to create new knowledge can be understood through principles of data body representation that Hayles (1999) discusses in *How*

⁵⁷ "Galenic medicine" is the collective term for describing the era of humoral medicine in which the teachings and writings of Galen were the foundation of medical practice in many parts of the world. Galenic medicine endured up until its greatest challenge came with the dissection of human cadavers by Antonin Vesalius in 1530, who disputed Galen's writings about human anatomy widely in Europe. Through human dissection demonstrations, Vesalius proved many of Galen's theories to be mistaken, and attributed them to constraints on human dissection that allowed Galen to only dissect animals (Bynum, 2008).

⁵⁸ I use the term "accurate" to refer not to an idea of a socially-constructed notion of perfection, but an idea of clarity and inclusivity that reflects transparent, traceable research that has a clear interpretation related directly to its initial purpose.

We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics. Hayles describes the concept of the *skeuomorph*, a representative model of data. Hayles also describes the phenomenon of the *Platonic backhand*,⁵⁹ in which a skeuomorph becomes the origin point of study for the development of future knowledge.

To operationalize the terms, consider the example of a clinical trial: human participants are studied, and information is collected and summarized in a report. The report acts as a skeuomorph that represents the condition. The trial may initially have tested the reaction of a specific condition to a treatment. The report is later used not only as the basis for the treatment for the condition, but to define features of the condition. This is the Platonic backhand—in the future, when the condition needs to be defined, the report from the clinical trial will be referenced instead of a brand new study being conducted to learn about features of the condition. If the skeuomorph has been constructed carefully, the Platonic backhand does not pose a risk when it comes into play as new knowledge is developed from prior study. If the skeuomorph is not constructed carefully, then the Platonic backhand may ground new knowledge in poor representation.

This is why the third tenet of pragmatic feminist empiricism must be considered in the design of technical communications in medicine. If the technical communications' skeuomorphic features reflect discourses that disempower certain embodiments, then the Platonic backhand poses a danger when the technical communications are referenced as sites of future knowledge. It is necessary, thus, to consider the potential uses of technical communications when representing human bodies in order to create definitions of health and disease that are inclusive.

⁵⁹ The term *Platonic backhand* refers to hierarchical nature of forms outlined in Plato's *Phaedo*, a dialogue in which the notion of truth or ideal knowledge is derived when the body is removed as a mediator. In this manner, the move of disembodiment and simplifying information is privileged as an ideal. Hayles (1999) describes the opposite move of the *Platonic forehand* as a shift from abstract to more concrete perceptions of truth and knowledge.

When coupled with the first and second tenets, the third tenet becomes the pinnacle of rhetorical awareness, questioning the primary and other potential audiences for technical communications and anticipating the types of discourse that might arise from the knowledge- and meaning-making power of technical communications in defining health and disease.



Through the examination of visual medical technical communications I will undertake in Chapters III and IV as well as the representation of the use of pragmatic feminist empiricism in Chapter V, I acknowledge that my own inquiry serves the particular aim of operationalizing pragmatic feminist empiricism as a methodology for intervention in visual medical technical communication to create more inclusive definitions of health and disease. I also acknowledge that the methodology may be applied to different situations and result in new knowledge. In acknowledging the multiple aims my inquiry may serve, I must consider what discourses my work will produce other than what I have intended, taking care to share my findings in such a way that new interpretations will not disempower embodiments—including those that represent what I determine to be dominant discourses—as creating a methodology for medical technical communication to create more inclusive definitions of health and disease does not mean privileged embodiments should be excluded.

Further Evidence Necessitating Pragmatic Feminist Empiricist Intervention

While I have argued in that intervention is needed in designing technical communications to benefit those whose embodiments are not adequately represented in medical models, I also want to show that pragmatic feminist empiricism benefits those whose embodiments act as the basis for standardized definitions of health and disease. It is true that centric epistemologies

undergird the scientific and medical disciplines—standardizing definitions, care, and treatment based on valued and privileged embodiments and not studying differences between all types of embodiments limits the possibilities of making new discoveries about health and disease that may contribute to better understandings of bodies for even those who appear to be empowered by current knowledge.

Apart from the example of ICD-10-CM as an improvement to defining diseases and conditions in more detail, other elements of clinical study have not been so concerned with specificity. Historically, the institutionalization of medicine brought forth movements to standardize healthcare in efforts to catalogue information about bodies and spread ideas efficiently in order to educate and certify medical professionals. “Standards are typically deemed laudatory; they are something one aspires to live up to. But standardization in its popular uses is derogatory; it connotes a dull sameness, the suppression of individuality in the service of industrial uniformity” (Timmermans & Epstein, 2010, p. 71). Standardization in medicine is meant to provide equitable healthcare that makes access to data and knowledge about definitions and treatment streamlined for their reuse and sharing.

Through the advent of medical technologies in the twentieth century such as the X-ray and other tools for anatomical measurement, in addition to policies governing the use of technologies and standardizing practices, the notion of a standard body based on the white-European males who founded medicine prevailed (Kevles, 1997; Payer, 1996). As the move to standardize medicine has advanced, however, even the embodiments of the status quo which appear to privileged are becoming invisible—new policies to incorporate women and minority participants in clinical trials in 1993, for example, coupled with no regulations in reporting practices, cloud data in that the resulting “body” from a study is not always even representative

of a “standard,” but rather is an amalgam of all the participant embodiments in a study.⁶⁰ The discourses that result regarding this imagined embodiment of health and disease are non-specific and may yield definitions that are inaccurate and may be used and interpreted as sites for future knowledge about all embodiments. With knowledge that factors such as sex and ethnicity impact the characteristics of health and disease such as symptomatic expression and treatment,⁶¹ there is a need for feminist inquiry to call into question how the unregulated expression of data in clinical trials creates discourse that disempowers all bodies through non-specificity.

According to Jenders (2010), a professor in UCLA’s department of medicine, there are many benefits to standardization, including “communication, interpretation, computability, and conformance/certification.” Jenders also recognizes the potential pitfalls of standardization, such as too many institutional organizations that influence standardization which exert discursive power over clinical practice. In standardizing definitions of health and disease, discursive power places the patient at the mercy of the definition’s accuracy or inclusivity. Foucault (1994) in *The Birth of the Clinic: An Archaeology of Medical Perception* writes:

We are dealing, rather, with qualitative varieties of the illness, to which are added the varieties that may be presented by the temperaments, thus modulating the qualitative varieties in the second stage. What classificatory medicine calls particular histories’ are the effects of multiplication caused by the qualitative variations (owing to the

⁶⁰ Epstein (2007) argues in *Inclusion: The Politics of Difference in Medical Research* that clinical trials use a concept called niche standardization, or attempt to provide definitions that fit certain groups in order to provide more accurate data. Niche standardization is expensive, however, and does not aid in combatting high costs of clinical testing. Epstein also points out that drug trials conducted by pharmaceutical companies tend to produce more positive results, which raises red flags regarding the integrity of trials in the first place. My concern is with the resulting reports of the data, and what discourses they create—discourses of sameness or difference, part of the “biopolitical paradigm” that creates ways of “defining, knowing, and governing populations that are derived from, and serve to shape, governmental and scientific practices simultaneously” to which Epstein devotes his work (p. 282).

⁶¹ See Johnson’s (2011) *His and Hers...Healthcare*, referenced in Chapter I.

temperaments) of the essential qualities that characterize illnesses. The individual patient finds himself at the point at which the result of this multiplication appears” (p. 14).

The point Foucault makes is that certain individual embodiments, when they are examined and classified with a definition of health or disease, are either going to be marked as deviations from a norm or studied to add to future definitions. In practicing pragmatic feminist empiricism, the technical communicator can consider multiple embodiments in order to inform the process of representing bodies and create more inclusive definitions of health and disease.

Implementing Pragmatic Feminist Empiricism in the Institutionalized Environment

As I have mentioned, it is often difficult to see the technical communicator as having complete authority to transform discourses through the implementation of pragmatic feminist empiricism; such authority is more limited in practice. There are professional worries, including the threat to job security if standards are not followed. From the perspective of technical communication as embodying professional genres, just as medical knowledge is based on centric epistemologies, there are genre expectations that may also shape discourse. As Miller (1984) notes in “Genre as Social Action,” “a rhetorically sound definition of genre must be centered not on the substance or the form of discourse but on the action it is used to accomplish” (p. 151). Miller’s statement relates directly to the third tenet of pragmatic feminist empiricism that asks technical communicators to consider the future impacts of their work when they are interpreted for sites of future knowledge.

What I am asking technical communicators to do is to exercise awareness of embodiment, acknowledge differences, and question discourses that result from standardization. As Herndl (1993) writes, scientific composition “lends itself to a mode of reporting that reproduces the dominant discourse of its research site and spends relatively little energy

analyzing the modes and possibilities for dissent, resistance, and revision” (p. 349). For researchers in medicine who are technical communicators, we need to change how we perceive embodiments and activate practices of feminist inquiry that call universal definitions of health and disease into question. There needs to be an awareness that acknowledges the potential for transforming discourse instead of reflecting dominant discourses or even non-specific, imagined discourses. Pragmatic feminist empiricism requires that the technical communicator become mindful through acknowledging embodiment—then the individual has the opportunity to act.

In using rhetoric to enact change, Fleckenstein (2009) highlights the importance of changing one’s vision. For the technical communicator-as-rhetor, pragmatic feminist empiricism offers a way to realize the existence of terministic screens that influence the way people understand the world. I also argue, in the spirit of Ratcliffe’s rhetorical listening, that one might also come to improve skills in locating the operation of figured worlds in discourses that result from technical communication. Acknowledging embodiments in the self and others may aid the technical communicator in identifying both terministic screens and figured worlds that may contribute to bias that may contribute positively or negatively to the empowerment or disempowerment of those represented and served by technical communications. Pragmatic feminist empiricism offers the technical communicator-as-rhetor a methodology in implementing decisions in designing and evaluating technical communications to develop more inclusive definitions of health and disease.

In outlining pragmatic feminist empiricism and providing a history of how embodiment, epistemology, and power have informed the institutionalization of medicine, I demonstrate the necessity for a new methodology for technical communicators. I want to show technical communicators that, when working in a discipline founded upon centric epistemologies, the

power to transform discourses—to make them living discourses—is only possible through the operating pragmatic feminist empiricism to achieve better rhetorical cognizance. To transform discourses, the technical communicator must embody change. Pragmatic feminist empiricism is, then, a methodology that, when embodied, will help technical communicators in the medical professions to create better representations of the bodies served by technical communication and, in turn, make definitions of health and disease more inclusive to benefit public health.

CHAPTER THREE

The Application of Pragmatic Feminist Empiricism in Expanding the Visible Human Project®

While Chapters I and II situate medical technical communication in rhetoric and offer a rationale for why pragmatic feminist empiricism is a necessary rhetorical tool to create more inclusive definitions of health and disease, Chapter III will illustrate the application of the methodology to analyze technical communicators in the expansion of the National Library of Medicine's Visible Human Project®. In focusing on what is valued regarding biological sex⁶² in and across medical fields, I will specifically analyze the rhetorical power of the Visible Human Female to challenge prevailing discourses of health and disease. The chapter will provide an analysis of professional and public discourses that reflect values regarding what constitutes health and a "normal" female body for both the medical field and the public, beginning with a brief overview of historical traditions of representing bodies through visual communications—specifically the representation of female bodies and reproductive systems. I argue in this chapter that the Visible Human Project® as a current source of clinical gold standards⁶³ for the study of anatomy and disease is technical communication that may benefit from pragmatic feminist empiricism as an intervention in its expansion. In focusing on the Visible Human Female and discourses surrounding her embodiment of health in both professional and public media, I will reveal the potential for the expansion of the Visible Human Project® overall as a site for

⁶² In using the term "biological sex," I am referring to the structures of the internal anatomy—both visible and non-visible structures (e.g. cells and chromosomes) that define an individual as "female," "male," or "intersex." In the case of this chapter, I am discussing reproductive ability and the narratives that guide value in particular sexes—namely, the female sex and childbearing ability.

⁶³ Clinical gold standards are guidelines for defining health and disease as well as best practices. For physicians, the power to define health, disease, and treatment are reserved through institutionally established standards and are meant to provide more universal approaches to medical epistemology and classification (Szasz, 2006; McMaster, 2008; Moynihan, 2016).

pragmatic feminist empiricism as an intervention tool. The influence of the Visible Human Project® in medical technical communications such as anatomy textbooks, which I will analyze through pragmatic feminist empiricism in Chapter IV, shapes medical discourse regarding health and disease. The Visible Human Project®, then, must be expanded carefully through the application of pragmatic feminist empiricism in order to help technical communicators create more inclusive discourses of health and disease that will become grounds for present and future medical knowledge.

The idea for the VHP was introduced in 1986 by Dr. Michael Ackerman, Chief of the Educational Technology Branch of the Lister Hill National Center for Biomedical Communications and Associate Director for Specialized Information Services at the National Library of Medicine (NLM). The project officially began its planning and institution in 1989 upon acquiring funding of \$1.4 million (NLM, 2016b; Thacker, 2001). The VHP would begin a search for cadavers that would represent “complete, normal adult male and female anatomy” which would be imaged through several medical technologies, including magnetic resonance imaging (MRI)⁶⁴ and computed tomography (CT)⁶⁵ (NLM, 2016b). Apart from applying medical imaging technologies to the full-body specimens for the project, in order to fully detail every aspect of the internal and external structures a milling process⁶⁶ of slicing the specimens—once frozen—at very small intervals then using high-resolution photography⁶⁷ to capture each layer would give researchers the ability to depict representations of human bodies in 3D.

⁶⁴ MRI, developed in 1971 by Raymond Damadian, images soft tissues and converts the images using magnetic waves and contrast agents (Bergman, 2015).

⁶⁵ “CT images bone, cartilage, and calcium deposits extremely well, but has difficulty imaging soft tissue surrounded by bone or cartilage” (Kevles, 1997, p. 173).

⁶⁶ In the milling process, the frozen body is sliced into small layers, reducing the specimen to dust by the use of a reciprocating saw (Spitzer & Whitlock, 1998).

⁶⁷ High resolution photography yielded RGB color images of each sliced layer of the specimens, which were backlit and imaged with a dark background, then reassembled along with MRI and CT scans to produce the 3D image.

When the Visible Human Project® (VHP) was first launched publicly in 1992, its mission was to provide three-dimensional (3D) models of the human body to act as sites for innovating imaging, surgical, and other medical practices through an interactive, “real” dataset (Ackerman, 1998; Waldby, 2000; Waldby, 2004). As a representation of various embodiments, the data sets were envisioned as a way to ground knowledge about bodily responses to disease, age, and trauma. As normative, healthy bodies, the VHP data sets were positioned as clinical gold standards meant to communicate what constitutes health and wellness for both the professional and the public audiences. Waldby (1997) writes:

The digitization of human bodies carried out by the VHP constitutes a startling development in medicine’s ability to manipulate human bodies. This new ability to “record” a human body through the violence of cryosection and to move it from normal everyday space across the screen interface into the domain of virtual space opens up serious questions about both the nature of this space and the ways medicine might use it.
(p. 5)

The VHP, according to the NIH (2015) statistics, has influenced over a thousand articles and countless visual projects. In addition, the VHP has also revealed misunderstandings of basic anatomy through its detailed 3D imaging of the internal structures. As a basis for clinical gold standards, then, the VHP as technical communication has the potential to continue changing medical discourses for the future.

In 1991 the University of Colorado at Denver received the contract to begin the selection process and carry out the collection of the data for the VHP under the direction of Dr. Victor Spitzer. The selection process for finding cadavers that were both “complete” and “normal,” beginning with the search for the male specimen, required the screening of thousands of cadavers

(Spitzer & Whitlock, 1998). Criteria regarding general health required that the specimens to be free of major diseases at the time of death and that the limbs and major organ systems be intact. According to Spitzer, Ackerman, Scherzinger, and Whitlock (1996), the candidates were screened

...for evidence of infectious or metastatic disease, surgery, or any other condition that might have altered or distorted the cadaver anatomy, or otherwise rendered it unsuitable for the project. The specimen's physical state was carefully examined for evidence of scars or distortion. The size and weight of the candidate were noted, and obese or emaciated cadavers were rejected... (p.119)

For the research team, then, notions of completeness and health status as "normal" were determined based on clinical guidelines put forth in prior research to screen specimens for the project. To fully determine the health status of the specimens during the screening process, each cadaver considered for the project was imaged through MRI and CT scans. The process of finding the first two specimens took approximately two and a half years.

In 1993, the body of a convicted Texan murderer, 39-year-old John Paul Jernigan, was the ultimate selection for the male specimen of the VHP. Jernigan's body, upon his execution by lethal injection, was sent to Colorado and immediately prepared for screening. Once deemed the candidate for the project, Jernigan's body, after being cryogenically frozen in an upright position, was milled into 1 millimeter (mm) sections and imaged with various technologies. Jernigan had willed his body to science before he was executed, though he did not realize he would become the face of the VHP.

The high-resolution images of Jernigan's body were loaded into a computer and unveiled as the "Visible Human Male" (VHM). In the medical community and the public, the VHM was

received well—heralded as an “angel” by some media sources (Cartwright, 1998). The following year, the body of an anonymous 59-year-old woman was donated to the VHP and selected as a gold-standard specimen—only this time, her body was milled at 0.33 mm increments to provide a higher resolution, more accurate representation of a clinically healthy human body. The Visible Human Female (VHF), though an improvement upon the quality of the VHM dataset, was not received as enthusiastically by the medical community and general public, a fact I will discuss in more detail later in the chapter. Discourse regarding health and disease and what is valued in both the medical field and the general public regarding biological sex is both reflected and challenged particularly through the VHF. There was little sensationalism regarding the acquisition of her body. Her husband donated her body to the project, though no one questioned whether or not her consent was truly informed, as with Jernigan’s case—a point worth noting in the larger context of how female embodiments are read as secondary to male embodiments. The lack of public discourse surrounding the donation of her body reflects a problematic understanding of the value and purpose of the “normal” female body. The reason for public criticism stemmed mainly from one issue: her reproductive status.

The VHF was postmenopausal. She was deemed healthy by the committee that selected her for the project, but for the public, her reproductive status somehow trumped the fact that she was a disease-free, ideal specimen based on search criteria selected from a pool of over 4,000 bodies received over a period of two and a half years. Meanwhile, the VHM was accepted as a virile and complete dataset, though Jernigan had lost one testicle in a surgery. Because the missing testicle was not a major organ, Jernigan was not excluded from the project. The missing

testicle was added once the dataset had been uploaded to make him whole.⁶⁸ Segal (1995) writes, “The point is there is no single construct that is science (or medicine); only differently prized—in other words, gendered—enactments of particular scientific (or medical) values” (p.111). Such was the initial case of the VHF—her reproductive status became her most identifying feature, according to the medical community and the general public, as I will show in this chapter.

The NLM responded to criticism upon release of the VHF which demonstrated the value of studying diverse embodiments and acknowledging their contributions to scientific knowledge. According to Spitzer and Scherzinger (2006), “...the human body exhibits an infinite variety of variations from “normal” structure, as well as normal and variant development of structures with age” (p.199). The VHP, in which Spitzer and Scherzinger both play major roles, claims to value all bodies in all stages of life, including those of the postmenopausal female the VHF represents—a challenge to how notions of “normal” are defined through technical communication. In order to make the VHP a more comprehensive set of data bodies and to demonstrate more value, Ackerman (1998) notes that technology will allow the expanding data sets to be altered to fit even more specific body variances—including race, trauma, and pathological characteristics. Projects like the VHP attempt to promote the value of diverse bodies by developing diverse data sets—expanding conceptions of normality while simultaneously centering research on diverse models of normality. As Waldby (2000) writes, the VHP uses data body construction from anatomy technology for the purpose of “...spatialising flesh as communicable knowledge” (p. 89). This knowledge is ever-expanding: the VHP has plans to grow, and though the VHF has been criticized by professionals and in the media for her reproductive status, the NLM defense and rationale for valuing her body and other body

⁶⁸ Data to supplement the missing testicle was obtained by a donor (Spitzer, Ackerman, Scherzinger, & Whitlock, 1996; Cartwright, 1998; Waldby, 2003). In addition, the VHM was missing the appendix and some teeth, which were reconstructed through donor data as well.

variations to provide better and more equitable healthcare serves as a great model for clinical research and the construction of data bodies—if the expansion of the project is continued and conducted carefully in ways that create inclusive discourses of health and disease, which its directors have promised.

My own embodiment of biological sex in some ways aligns with that of the VHF, and in some ways does not. For instance, my reproductive system functions differently than that of the VHF, where I am still able to reproduce naturally. When I look at the VHF and at my own body, there are marked differences that are the result of age, experiences, and other types of embodiments that distinguish us from one another. The VHF is different from me, but there are others who might identify more closely with the embodiment of health that the VHF represents. In addition, there is information in the VHF dataset that may inform how my embodiment of health can change specifically based on my biological sex. I argue in this chapter that biological sex alone has been the source of most knowledge and value of difference in the medical field in the study of women's bodies. Would I call out the NLM for their choices of the VHF because the embodiment represented does not match my own? No, I would not. And what of the VHM? I would not discredit that dataset either. Information from the VHM can also help me along with many others by valuing sexual differences between embodiments—embodiments with all types of reproductive status.

As I have pointed out in Chapters I and II, biological sex affects not only reproductive status but other aspects of cellular and organ system function. As I have also detailed in previous chapters, the medical field has historically based its foundations of knowledge as well as its institutionalization upon androcentric views of embodiment—centric epistemologies that situate medical understandings and discourses of health and disease based on a standardized male body.

Pollitzer (2013) notes that by asking research questions about aspects of health and disease based on sex in particular, medicine has the power to add value to knowledge on scales even larger than disease alone in order to construct more accurate data body representations: “The benefits are considerable, not only for the quality and outcomes of research, but for new opportunities to apply research findings to create new markets for science knowledge.” These “new markets” can benefit and grow from a pragmatic feminist empiricist approach—an approach that takes into account the numerous embodiments that are involved in the construction of data bodies in medical technical communication that display sex differences. A study of the way diseases or traumas affect the sexes differently can benefit all types of embodiments. The Visible Human Project®, if expanded using pragmatic feminist empiricism, may help to address or correct discourses of health and disease that only value biological sex in assessing reproductive function and fail to acknowledge the value of difference in studying the role of biological sex in cellular and organ system functions.

Though many feminist theories call for “eliminating binary thinking and identif[y] gender, along with class and race, as a historical construct,” certain factors such as biological sex and race⁶⁹ are embodiments that need to be constructed in data bodies to provide clear representations of the people who might benefit from knowledge about those bodies (Gurak & Bayer, 1994). For the sake of equality and fairness, as well as acknowledgement of multiple embodiments that are served by medical technical communications such as the VHP, pragmatic feminist empiricism in medical technical communication requires the recognition of value in differences regarding biological sex that must be made apparent in order to help technical

⁶⁹ A discussion of race and ethnicity as they impact the manifestation of disease and treatment would also be an applicable use of the methodology in this chapter, but the research is limited to a certain amount of space for study. I hope to apply the methodology in future studies of other embodiments in order to address other exigencies in helping to create more inclusive medical technical communications.

communicators create more inclusive, more accurate definitions of health and disease. This chapter will investigate and analyze the way visual medical technical communications represent biological sex and what the field values regarding sex. I will begin with a brief history of visual representation in medicine and a discussion of the VHP as a source of clinical gold standards. Then, I will provide an analysis of the VHF as well as how the VHP should continue to expand to impact discourses of health and disease so that they are more inclusive.

A Brief History of Early 3D Models in Modern Medicine before the Visible Human Project®

As Chapter II noted, the history of the institutionalization of medicine as a field was greatly influenced by the advent of the printing press around 1440, making the spread of information in the field more accessible and faster throughout the globe. In looking at early anatomical models following the advent of the printing press, it is important to keep in mind the three tenets of pragmatic feminist empiricism as they apply to each of the historical anatomists that are mentioned—their embodiments, the embodiments of their audiences and contemporaries, and the multiple aims of their inquiry.

The publication of *De Humani Corporis Fabrica*⁷⁰ and *De Humani Corporis Fabrica Librorum Epitome*⁷¹ in 1543 by Andreas Vesalius brought with it a new revision of anatomy—challenging theories of Galenic medicine⁷² and sharing this new information through visual

⁷⁰ *De Humani Corporis Fabrica*, the first published anatomical atlas by Vesalius, contained detailed illustrations of the human body.

⁷¹ *De Humani Corporis Fabrica Librorum Epitome*, a companion piece to the original *Fabrica*, provided specific labeled directions on how to read the images as if the reader were participating in a dissection. In addition, the volume also included a “cutout manikin” for readers to simulate dissection (Cambridge, 2016).

⁷² Galenic medicine, built on a model of the four humours and balance, based anatomical understanding of bodies upon dissections Galen conducted on animals, due to the prohibition of human dissection; thus, Vesalius found through dissecting human cadavers that many of Galen’s anatomical illustrations were inaccurate.

representation of the human bodies he dissected himself.⁷³ While the tradition of medical illustration to teach students was not pioneered by Vesalius, his highly detailed drawings became an important visual educational tool for training physicians and the public about anatomy.

Apart from a tradition of two-dimensional (2D) representations of human bodies that was vital to the institutionalization of modern medicine through illustrations such as those of Vesalius, Cowper,⁷⁴ Valverde,⁷⁵ Valsalva,⁷⁶ and others which I will discuss in further detail in Chapter IV, 3D representations of human bodies were in some ways even more valuable than the 2D in terms of teaching physicians to practice and diagnose. Like the VHP, 3D models of human anatomy helped to communicate more information about how bodily functions worked in relation to one another. The 3D model also, unlike the 2D illustration, had the potential to resemble more closely the cadaver—without the difficulties that arise in procuring actual bodies and preserving them efficiently and in a way that slows decomposition during the dissection process.

3D models of human bodies for anatomical study in medicine were heavily influenced not only by atlases⁷⁷ of human anatomy, but by art. 3D models as technical communication embodied the experience and knowledge of the technical communicator who designed them, in addition to the embodiments the technical communicator studied and valued. In the eighteenth

⁷³ In the traditional anatomical theatre which was a public spectacle, the anatomist did not typically dissect the body, but relied on an assistant to make all cuts while the anatomist lectured. Vesalius was the first anatomist to hold the scalpel himself in the anatomical theatre while he lectured simultaneously (van Dijck, 2005).

⁷⁴ William Cowper (c. 1666-1709) was an anatomist and surgeon in the eighteenth century known for his contributions to modern surgery and for the discovery of the Cowper's gland in the male reproductive system (Sanders, 2005).

⁷⁵ Juan Valverde de Amusco (c. 1525-?) is best known for his *Historia de la Composicion del Cuerpo Humano*, published in 1556. A mostly-plagiarized version of Vesalius's *Fabrica*, Valverde's *Historia* corrected many of the structures in *Fabrica* (Choulant & Frank, 1962).

⁷⁶ Antonio Maria Valsalva (1666-1723) was an Italian anatomist known for his findings in the sinuses, whose treatise on the ear outlines a surgical method for removing foreign bodies from the canal through a special "maneuver" named after him (Jellinek, 2006).

⁷⁷ Essentially maps for understanding the connections between anatomical structures in bodies meant for medical practitioners, the term "atlases" was adopted to describe collections of illustrations (Aldersey-Williams, 2013).

century, the use of wax figures to stand in for cadaveric study was a common practice to answer problems of procuring bodies. The career of the “wax anatomist”—a technical communicator working to relay information in 3D—rose as a bridge profession between fine arts and medicine, where the anatomist produced works cast⁷⁸ and carved in wax based on anatomical study. These models educated both medical professionals and the public about the inner structures of bodies. One of the most influential and pioneering wax anatomists of the eighteenth century was Anna Morandi,⁷⁹ who produced 3D models of bodies in many states of age and development. Known particularly for her work in the study of the sense organs, as well as with hands and the male reproductive system, Morandi made a name for herself for her models in Bologna and beyond. In addition, Morandi was an earlier practitioner of pragmatic feminist empiricism in that she used her own embodiment to focus her research, acknowledged differences and valued them, and was committed to producing accurate models for many uses to aid in the improvement of medical education. It is estimated that Morandi—who also worked with her husband, Giovanni Manzolini,⁸⁰ before his death—dissected over a thousand cadavers to produce series of organs and organ systems for educational use in wax.

One example of the impact of Anna Morandi’s work that supports the power of 3D models and demonstrates their value in the historical institutionalization of medical fields is in obstetrics. A commission from Giovanni Antonio Galli⁸¹ in 1746 of over 150 models of the

⁷⁸ To cast a part of the anatomy in wax, as was practiced in the 16th centuries and following, first a plaster mold is made by covering the specimen and allowing the plaster to harden; then, the plaster mold is removed and filled with wax that hardens in the shape of the original specimen upon removing the mold (Riva, Conti, Solinas, & Loy, 2010).

⁷⁹ Morandi (1716-1774) lived and worked in Bologna, Italy as a female anatomist recognized by the Art Academy—a rarity in her lifetime (Messbarger, 2010).

⁸⁰ Manzolini (1700-1755) worked as an anatomist and professor at the University of Bologna and was known for his contributions to the improvement of anatomical wax models during his lifetime (Museo di Palazzo Poggi, 2016).

⁸¹ Giovan Antonio Galli (1708-1782) was a physician in Bologna, Italy who contributed to the institutionalization of the field of obstetrics through his study and publication of anatomies and physiologies of pregnancy (U di Bologna Obstetrics, 2016).

female reproductive system—including the gravid uterus⁸²—helped to establish the field of obstetrics in institutionalized medicine and for midwives⁸³ practicing outside of hospitals. The commission of 3D models was given to Morandi and her husband, who were to use Galli’s illustrations from his dissections along with their own notes to produce the models. The use of 3D models in medical education became even more valuable as fields of specialization, like obstetrics, began to grow. A mother herself, Morandi was able to use her own embodiment in the development of the models, having noticed changes in her own bodily proportions during various stages of pregnancy. Morandi also worked closely with Galli and her husband to ensure the models would be representative of various reproductive stages and for the purpose of improving both public health and medical education. The commissioned models as well as Galli’s notes on working with Morandi and her husband demonstrate pragmatic feminist empiricism in action as well as Morandi’s commitment to accuracy and inclusivity.

Though Morandi took commission work often during her career, she also wrote and published her own research in order to influence her own knowledge about anatomy and inform her teaching at the Academy of Sciences, to which she was given a post upon her husband’s death. Working from actual cadavers and continuing to reference atlases of anatomy, Morandi noted errors in the works of Vesalius and other famous anatomists and attempted to correct them in her models and in her writings—her technology of modelling in wax operating in the same vein as the VHP to improve the way the body is visually represented and to change discourse.

⁸² The term “gravid uterus” refers to the “pregnant uterus” (Mosby, 2009).

⁸³ Working in a field dominated by men, Galli was well-aware that the institutionalization of obstetrics would not allow proper education for midwives who traditionally treated and delivered pregnant women in the 1700s, thus he installed a “portella” or secret door in the rear of the institution to ensure that midwives had access to his lectures and research in order to educate them for the benefit of public health (Messbarger, 2010).

One of the most important corrections that “The Lady Anatomist”⁸⁴ made was in response to scientific misogyny of the time that privileged the male body and mind based on so-called biological findings (Cieslak-Golonka and Morton, 2000; Rosito, Mancini, Ruggeri, and Paolucci, 2004; Messbarger, 2010). Regarding women, the popular biological discourses of Morandi’s time—a time when modern medicine was gaining stronger footholds in its institutionalization—was that the blood in female bodies is concentrated mostly in the reproductive structures and the thickness of tissues in those structures slows the rise of blood into women’s brains, thus inhibiting their thinking capabilities. This notion was made popular through the writing of Antonio Conti.⁸⁵ Other discourses at the time also echoed this idea, including France Ferdinando Galiani’s⁸⁶ “Croquis d’un dialogue sur les femmes,” published in 1772, in which he referred to women as “deranged animals” who biologically and physiologically could not think as men. Morandi’s undertaking of examining the male reproductive system identified no differences in the tissues of the male system from that of the female, and she continued to study the differences in the muscle and fascia as well as other tissues to determine that there were no thicknesses in the female system that would hinder blood supply, thereby disproving Conti’s theory.

Morandi’s choice to present her findings that tissues were the same in male and female reproductive systems was a rhetorically calculated move that reflected her own embodiment as a

⁸⁴ Embodying female biological sex and that of the anatomist worked both for and against Morandi’s popularity. As a woman, her expertise in anatomy was a rarity that made her a novelty for collectors of her work. While she is recognized in accounts of her life as having won accolades and a stipend from the Art Academy upon her husband’s death and her appointment, the stipend was a sum so small that she was forced to give up her eldest child for adoption and to move into an apartment to be supported by a benefactor until her death (Messbarger, 2010).

⁸⁵ Antonio Conti was a cleric in eighteenth-century Venice who, in an effort to prohibit women from holding any sort of power or status, published work that reasoned women were inferior to men based on biological theory (Messbarger, 2016).

⁸⁶ France Ferdinando Galiani (1728-1787) was French economist who supported theories of biological misogyny such as those of Conti (Rossi, 1930).

woman and as a professional anatomist (Messbarger, 2010). In order to communicate effectively with the professionals in her field and with the public, she chose the male reproductive system in order to add knowledge to the field in ways that might appeal to the male standard body upon which science was based, subversively informing medical discourses by using the male body—the body of her contemporaries—to show that tissues were similar without explicitly refuting Conti’s claims. If Morandi had used the female reproductive system to make her point, contemporaries would have refuted her work based on the androcentric model upon which medical knowledge was based at the time. Other examples of rhetorical acts in order to achieve changes in discourse and to preserve her own ethos came in Morandi’s published writings, where in moments when she discovered errors in the works of Galen and Vesalius she began by praising them and referencing them, following their praise with her own findings. In her published case study of the ear,⁸⁷ for example, Morandi begins the narrative of her findings with “And here I am pleased to admit that I am unable to accommodate the findings of Rivinus” in order to refute politely the findings in research of one of her contemporaries, Rivinus,⁸⁸ who studied membranes of the ear canal (qtd in Messbarger, 2003). Morandi’s ability to acknowledge her own embodiment, the embodied differences in others’ bodies (those of her professional audience and the populations served by the technical communication), and to forecast the future impacts of 3D models on the future of medical education make her a great example of how pragmatic feminist empiricism may be applied in visual medical technical communication.

Through her embodiment of art, anatomy, and womanhood in the eighteenth century—embodiment that includes experience and knowledge—Morandi went on to influence wax

⁸⁷ see Morandi, Biblioteca Universitaria, Bologna, ms. 2193, f 22 v, r

⁸⁸ August Quirinus Rivinus (1652-1723) studied the tympanic membrane of the ear, working with his son Johanes Augustus Rivinus to publish case studies in ear anatomy (Messbarger, 2003; 2010).

anatomists internationally during her lifetime. Her models also went on to influence the institutionalization of medical knowledge in the contributions she made to correcting errors made in prior works. Though she is only mentioned briefly in most histories of medicine as a contributor to medical knowledge through her 3D models and detailed written texts regarding her findings, Anna Morandi in many ways demonstrates why projects like the VHP are important educational tools for technical and public audiences. Her 3D models—so detailed that they were often mistaken for the actual organs they represented—embodied her own knowledge of the bodies she encountered in dissection, and they also embodied bodily discourses of institutionalized medicine at the time, discourses that identified male bodies as standard and female bodies as deviations from the standard.

The Embodiment of Reproductive Values in the Representation and Study of Women’s Bodies before and Leading up to the Visible Human Project®

Morandi’s 3D models are a precursor to the VHP in that they demonstrated the power of the visual in medical education. The models also embodied a great deal of who Morandi was—a woman to reproduce embodiments bound by dominant medical discourses to which she did not always subscribe. As an early example of how a visual technical communicator can practice pragmatic feminist empiricism, Morandi made rhetorical choices in her work that allowed her models to be both more inclusive and more accurate for the betterment of public health and medical education.

For Morandi and other women in the eighteenth century and following, differences in male and female embodiments were understood primarily through the reproductive system. Differences in sex were perceived in early modern medicine through the visible, which was often identified in the reproductive system. According to Sawday (qtd. in Barnes, 2009), “The female

body *was* held to be monstrous and grotesque, a region of erotic desire governed by the quasi-autonomous uterus” (p.36). The female reproductive system as the site of deviation from the male standard body as norm, then, was a major site of study unique to women’s bodies.

In general, the preoccupation with women’s bodies in medicine included physical appearance in addition to the reproductive system. Apart from the wax anatomical models produced of the uterus by Morandi and other anatomists of the eighteenth and early nineteenth centuries, a trend of producing representations of dissected female bodies dubbed “anatomical Venuses”⁸⁹ was a popular fusion of the social constructs of ideal beauty and an erotic exposure of the major organ systems, including the reproductive system, and genitalia. Anatomical Venuses as technical communications were meant for both medical students and for the general public. The embodied features of the anatomical Venuses—often enraptured facial expressions, long hair, and unblemished skin—coupled with the open body often in a state of auto-dissection⁹⁰ communicated to its viewers the values of both medical and scientific study as well as societal ideals of beauty. The values embodied in the anatomical Venuses might have differed in appearance and been more useful and enduring had their designer exercised pragmatic feminist empiricism, taking into account the diverse embodiments of the women they were meant to “represent” and considering the future impacts of the work in practicing medicine based upon the models on real women.

⁸⁹ Anatomical Venuses such as those of Felice Fontana, director of the Florentine La Specola museum in the 1700s, and Clemente Susini, a sculptor at La Specola who worked with Fontana, were meant both as instructional models and public spectacles to celebrate the aesthetic beauty of the dissection of women’s bodies (Museo di Storia Naturale, 2016).

⁹⁰ “Auto-dissection” refers to a style of modeling an anatomical Venus in which the structures are presented in a single unit not meant for assembly and disassembly, but in a completely visible manner in which to view the structures all at once without handling the model (Ebenstein, 2016).

Other visual fascinations with women's bodies came in the form of scientific racism, as I mention in Chapter II. One example is that of the exploitation of a Cape Town Khoikhoi⁹¹ woman named Saartjie Baartman.⁹² Baartman, referred to as "Hottentot Venus,"⁹³ was brought to Europe in 1810 by a Dutch physician who was interested in her physical appearance—the size and shape of both her buttocks⁹⁴ and her labia.⁹⁵ Apart from the exploitation of Baartman as a sideshow feature in Europe during her lifetime, upon her death a cast was made of her body and her genitalia and skeleton were preserved then displayed in Paris museums up until the mid-1970s. Her remains were interred in 2002 at the request of Nelson Mandela. Her remains as technical communication, on display for the medical community and the public, reflected discourses that illustrate scientific racism and misogyny in their representation and objectification of women from Baartman's region as having only entertainment value—value in the sense of novelty in that they did not even deserve respect for their remains. When technical communication is designed without acknowledging the embodiments of others and the future implications of inquiry, harm may be inflicted, as in the case Baartman and those who identify with her embodiments—harm that could be avoided through the use of pragmatic feminist empiricism to create more inclusive definitions of health and disease.

As for visual differences that encouraged the study of women's reproductive systems, sex-based differences in bodies that could not be seen with the naked eye were first discovered

⁹¹ The Khoikhoi people in Southwestern Africa were known for herding cattle referred to as "Hottentots," a derogatory term with which they described the rhythmic "clicking" language of Khoisan, by Dutch settlers (Gates and Appiah, 2010).

⁹² Saartjie Baartman (1789-1815), performed in Europe from 1810 until her death from an inflammatory disease (Cantanese, 2010).

⁹³ In a reference to the Dutch moniker of "Hottentot," the name "Hottentot Venus" referred to the exotic and eroticized European view of Baartman's appearance which differed greatly from the European standard of beauty and made Baartman a novelty (Holmes, 2008).

⁹⁴ Steatopygia is the presence of large amounts of fat in the buttocks (Oxford Reference, 2017).

⁹⁵ *Sinus pudoris* is the medical term for elongated labia, which in Khoikhoi women was typical; Baartman never exhibited her labia while she was alive and touring, though spectators could touch her buttocks for a small fee (Martone, 2008).

by Dr. Nettie Stevens⁹⁶ in the early 1900s, who found that differences between bodies occur on the chromosomal level. Though Stevens made this amazing discovery, her ideas were not acknowledged as they should have been, as reforms to health and disease definitions that are based on sex differences are only in the past thirty years beginning to be taken seriously—as I demonstrated in Chapter I when discussing the passage of the 1993 Public Health Service Act requiring the inclusion of all genders and ethnicities in clinical testing.

The Visible Human Female, then, as I will show through the application of pragmatic feminist empiricism in the analysis of professional and public reception, reflects discourses of reproductive value and may be a site of transforming discourses if the project overall is expanded carefully. In the analysis that follows, I will further demonstrate the importance of creating inclusive definitions of health and disease that may become the site of clinical gold standards upon which future knowledge about health and disease are based.

A Case Study⁹⁷ of the Visible Human Female and Values

I have chosen to present my analysis of the VHF using pragmatic feminist empiricism in the form of a case study in order to offer a full narrative regarding reproductive value in the VHF and provide readers with the most descriptive analysis of discourses regarding difference possible, necessitating the need for pragmatic feminist empiricism as an intervention tool to aid in expansion.

⁹⁶ Nettie Stevens (1861-1912) published *Studies in Spermatogenesis* in 1905, which demonstrated her findings regarding chromosomal sex differences.

⁹⁷ A case study, following Gerring's (2004) notion of its definition, is a smaller analysis of an issue where findings may be applied to larger iterations of the issue. For my work in analyzing the VHF and values associated with the dataset, I am focusing on a single issue regarding reception and the implications of the choice of the donor body. The use of the case study, then, is to provide readers with a real application of pragmatic feminist empiricism as a methodology for expanding the VHP to become more inclusive technical communication about embodied value in medical models.

The format of a case study also allows me to rhetorically present the analysis, acknowledging my own embodiment in order to include myself in the analysis, as pragmatic feminist empiricism encourages. My own embodiment as a female medical rhetorician influences my interest in studying the VHF and the epistemological ways I do so; however, using the VHF and highlighting reproductive values is an example of how pragmatic feminist empiricism can help the VHP to expand overall. I argue that values other than reproductive—such as race, which also impacts the manifestation and treatment of disease—also demonstrate the need for careful expansion of the VHP. For the purposes of this dissertation, I am deliberately only analyzing one aspect of difference that exemplifies how certain traits of embodiment are valued and how the representation of these traits influence discourse—a difference to which I can personally relate and that may also help me to negotiate my role as a technical communicator who is equally served and represented by the technical communication which I analyze. It is my hope that future scholars might follow this type of analysis with a race-based approach.

The preoccupation of the professional and public realms with reproductive function in women, as I have shown in this chapter thus far, is bound by both a rich social and cultural history of gender constructs⁹⁸ as well as institutional standards and practices based on centric epistemologies. For women, including myself, the ability to reproduce is often a social and cultural rite of passage into “womanhood.” The cessation of reproductive capacity through natural or surgical means also signifies for many women a notion of loss or a feeling of incompleteness. For the NLM to have chosen a postmenopausal woman for the VHP, then, challenges female reproductive narratives in both the professional and public spheres.

⁹⁸ To be clear, I want to draw a distinction between the meanings of “sex,” and “gender,” where “sex” refers to biological structures that govern one’s physiological identity and “gender” refers to one’s sense of belonging to social and cultural constructs of identity that are traditionally ascribed to one’s biological sex.

This case study will analyze discourses regarding the VHF and value from three points of view: the NLM position on health and value of the VHF, professional responses through the development of other projects regarding the VHF and reproductive value, and public responses to the VHF as a model of health to set clinical gold standards. Upon presenting the discourses surrounding the VHF and value in each section, I will then provide a summary of implications and apply pragmatic feminist empiricism to these implications in an effort to look ahead at how the VHP must go about expansion in order to create more inclusive definitions of health and disease through the current and future data sets as technical communication.

NLM Positions Regarding Value in the VHF

As the source of the VHP, the NLM determined the VHF as a viable candidate for the VHP based on several factors regarding her health and disease status. According to the CDC Health Indicators Warehouse (2016), health determinants include “disease incidence or prevalence, or other health states.” Disease presence played a large role in selection in defining a candidate as healthy. Spitzer and Whitlock (1998) write of the VHP:

Where and how would we obtain intact adult human cadavers, free of infectious or invasive disease, from which the digital database could be constructed?...The final choices for the VHP were made from sample sets of three cadavers of each sex after reviewing their medical records and analyzing survey radiographs, CT scans, and MR images of each candidate. (p. 50)

The VHF candidate, who remained anonymous, met the criteria for basic health in that her body was devoid of any major disease or organ and tissue damage—she died of a heart attack. The criteria for selection reflects traits that are valued by the designers that will contribute to the goal of the VHP; the ability of a cadaveric body to represent these values grants it “biovalue,” which

Waldby (2000) describes as a body's conversion to data in order to benefit the wellbeing of the living. Perceptions of biovalue may be influenced through the use of pragmatic feminist empiricism to acknowledge differences in embodiments and consider the future aims of the inquiry. In the VHF donor's case, the NLM foresaw the potential of her biovalue, once acquired through technological translation, as helpful for improving definitions of health and disease for the living—acknowledging the embodiments of those who would be served by the VHF as technical communication was a direct exercise of pragmatic feminist empiricism. Fountain (2015) writes in *Rhetoric in the Flesh* that “The cadaver becomes the object of anatomy and the primary text on which this anatomy is written” (p. 166). As for the VHF dataset, several discourses regarding its biovalue conflict based on the VHF donor's age and reproductive status resulting from her age. According to Cartwright (1998), “The [Visible Human] Project's presentation of the Visible Woman suggests a different criteria for normal female anatomy. The Visible Woman is represented as older, her age is linked to her sex and reproductive function, and specifically it is implied that she is menopausal” (p. 30). The rhetorical significance of the choice of a postmenopausal donor body expands the value of reproductive embodiment traditionally stressed through historical studies and representations of the female body as different and deviant from the male body in terms of reproductive difference. Waldby (1996) writes:

[The] ‘problem’ with the VF data derives from one of the central epistemological problems in anatomy generally: the problem of the norm and the ordering of the distinction normal/pathological. In this case the age of the Visible Woman's body renders its status as normal problematic, departing as it does from an implicit equation of the normal female body with the youthful and the reproductive. (p. 18)

As I have already shown in this chapter, the historical centric epistemology that situates the reproductive system as the departure of female embodiment from male standards locates the capacity to reproduce as a site of value in the study of women's bodies. The NLM's departure from the tradition of privileging actively reproducing bodies in its choice of the first female dataset creates the opportunity for the medical field to reconsider the reproductive privileges its technical communications reflect that shape health and disease discourses—to exercise pragmatic feminist empiricism in acknowledging multiple embodiments of those who are both represented and served by technical communication.

According to Spitzer and Scherzinger (2006), "...the human body exhibits an infinite variety of variations from 'normal' structure, as well as normal and variant development of structures with age" (p. 199). The VHP, in which both Spitzer and Scherzinger both played major roles as principal investigators, claims to value bodies in all stages of life, including those of the postmenopausal female the VHF represents. Ackerman (1999), refers to both datasets of the VHP as a "common reference point" for applying medical technologies and testing medical theories about bodies (p. 669). As a "common reference point," then, the VHF's biovalue was acknowledged as a site for the development of clinical gold standards.

Clinical gold standards, when they are established, are bound by institutional, social, and cultural values in their creation. These clinical gold standards are also applied to the development of models such as the VHP while, simultaneously, also deriving new meaning from the creation of technical communications such as the VHP. What Daston and Gallison (2010) write regarding anatomical atlases applies in the case of the VHP, that representations determine "what is worth looking at, how it looks and, perhaps most important of all, how it should be seen" (p. 23). The VHP as a basis for clinical gold standards is embodied with prior institutional,

social, and cultural values—values that shape it as technical communication. The VHP also has the power as technical communication to impress upon its viewers what bodies should like and what makes them important, which may not only reflect but transform current discourses about value. Lizama (2009) writes in “The Post-Biological Body: Horror, Nostalgia, and the Visible Human Project®” of representation:

The [Visible Human] VH, then, is not a neutral representation of the anatomical body, but rather the model for a particular kind of body produced by the intersection of anatomy and digital technologies. Moreover, the logic underpinning the VHP extends, by implication, to the “normal” bodies of which the VHs are allegedly representative. (p. 118)

The idea of “normal” is complicated and, as prior chapters have mentioned, not a purely objective and value-free concept. “Normal” is constructed from concepts of health and disease as the institution of medicine has developed them—the definition of which is derived from centric epistemologies, including epistemologies deriving from the male body as a standard for understanding anatomy and physiology.

The VHP, however, seeks to value multiple embodiments in its long-range plans—perhaps challenging notions of “normal” in its expansion. The acknowledgement of biovalue in the VHP is an exercise in pragmatic feminist empiricism that looks forward to future implications of the VHP. In order to make the VHP a more comprehensive set of data bodies and to demonstrate more value, Ackerman (1998), the researcher who first conceived the idea for the project, notes that technology will allow the expanding data sets to be altered in the future to fit even more specific body variances—including race, trauma, and pathological characteristics. Projects like the VHP attempt to promote the value of diverse bodies by developing diverse data

sets. As Waldby (2000) notes, the VHP uses data body construction from anatomy technology for the purpose of “...spatialising flesh as communicable knowledge” (p. 89). This knowledge is ever-expanding: the VHP continues to influence medicine and seek opportunities for expansion, and the NLM defense and rationale for valuing the VHF donor’s body and other body variations to provide better and more equitable healthcare serves as a great model for creating more inclusive representations to aid in defining health and disease.

Professional Responses to the VHF

Upon the development and release of the VHF dataset, several professional entities began to develop projects to expand upon the original project. While expansion and new technological advancement is part of the goal of the VHP overall, the inspirations for these new projects were couched rhetorically as critiques or improvements upon the VHF dataset based on her age and reproductive ability. In other words, these responses, while they recognize different embodiments, attempt to devalue the embodiments that are represented in the VHF; these attempts to devalue the biovalue of the VHF’s embodiments is counter to the idea of creating more inclusive definitions that are promoted by the use of pragmatic feminist empiricism as a methodology. One of the first examples I would like to reference is that of the Stanford Visible Female (SVF) pelvic dataset.

The Stanford Visible Female (SVF) dataset. Developed in 2004 as a model for building a pelvic simulator⁹⁹ to aid medical students in giving thorough, comfortable pelvic exams, the SVF dataset was based on the donor body of a 32-year-old female with active reproductive status. Dubbed “Lucy,” the SVF was developed as an improvement upon the VHF dataset.

Montgomery, Heinrichs, Bruyns, Wildermuth, Hasser, Ozenne, and Bailey (2000), developers of

⁹⁹ A pelvic simulator is a 3D model of a human pelvis that is equipped with force fields that mimic real, human responses to touch through a series of technologies that enable translation of contact with instruments and the user’s hands to a computerized response to measure pressure.

the pelvic simulator based on the SVF at Stanford, state the following regarding the choice of the donor body for the SVF:

This data set is similar to that of the Visible Human Project. However, the specimen is that of a 32 year old reproductive age female, in contrast to the 59 year-old post-menopausal Visible Human Female which reflects the atrophic signs of post-menopause.
(p. 2)

The SVF donor choice reflects the aims of the project to produce a model of the female pelvis to develop a simulator, yet publications such as the aforementioned by principal investigators in the project make a special point to acknowledge the VHF dataset as incomplete in creating the pelvic simulator. The use of a 32-year-old donor female with an active reproductive system in the SVF is indeed helpful and inclusive in developing a simulator for pelvic exams; however, the simulators that are based on this data reflect a privilege of active reproductive status in that the project implies women who do not have this status are not privy to as thorough and comfortable pelvic exams. Currently, there are no pelvic simulators which use the VHF dataset, and no publications indicate any simulator projects are in development which use the dataset.

According to the North American Menopause Society (2016), pelvic exams are absolutely necessary for women who are in every stage of reproductive status—including those who are post-menopausal. The primary structural difference in the reproductive system during pre-, peri-, and post-menopausal phases in women is the thickness of the walls of the internal structures¹⁰⁰ of the reproductive system. This difference alone provides substantial justification for the acknowledgment of various embodiments of female reproductive status in creating a simulator for pelvic exams, as tissue thickness may influence the way a pelvic exam should be

¹⁰⁰ By “internal structures,” I am referring to the walls of the abdomen as well as specific reproductive organ tissues such as the ovaries, uterus, cervix, etc.

conducted. Pragmatic feminist empiricism promotes the acknowledgement of various embodiments served by technical communication that could lead to a better technology for pelvic exam simulators that makes exams more comfortable for more people. The SVF uses its own dataset for Lucy—an implication again that the active reproductive system is privileged. The goal of the SVF, according to its organizers, was explicitly to produce “accurate 3-D models of female pelvic anatomy for use in surgical simulation,” although the project only represents one type of reproductive system (qtd. in Flanagan & Booth, 2002). If the pelvic simulator is meant to be “accurate,” it should address the needs of women in all stages of reproductive status; thus, its approach to design falls short and contributes to the narrative of privilege that accompanies active reproductive status (Smit, Kraisma, Jansma, DeRuiter, & Botha, 2013). This failure to acknowledge embodiments of women who do not have active reproductive status in designing simulators does not an inclusive representation of the pelvis make.

The Visible Korean (VK) and Chinese Visible Human (CVH) female datasets. A similar response project in the Visible Korean (VK) and Chinese Visible Human (CVH) projects took the same approach to their introduction of the female datasets. The VK and VCH datasets were created as expansions of the VHP dataset to include more ethnicities—a great exercise in acknowledging multiple embodiments to make health definitions inclusive, as pragmatic feminist empiricism encourages. Initiated in 2001 the VK and CVH projects were, like the VHP, meant to produce complete,¹⁰¹ healthy, normal representations of male and female embodiments (Kim, Chung, Hwang, Park, 2002; Zhang, Heng, Liu, Tan, Qiu, Li, Liao, Li, Cui, Guo, Yang, Liu, Shan, Liu, Zhang, Chen, Wang, Chen, You, Pang, Xiao, Xie, & Cheng, 2004; Dai, Chung, Qu, Yuan, Liu, & Shin, 2012). While this expansion supports the idea that there are other embodiments the project should acknowledge in creating datasets to reflect differences, the

¹⁰¹ The word “complete” refers to the presence of all organ structures in an undamaged state.

principal investigators in both the VK and CVH projects tout their joint development of the female datasets as improvements upon the VHF in that their representations are somehow more valuable—they sought candidates whose reproductive systems were actively functioning. According to Zhang et al. (2004), “A key aspect of the CVH project was to use cadavers that were from relatively young adults (20–40 years), and of typical height (160–190 cm) and weight (e.g. no evidence of obesity or emaciation)” (p. 166). In the VK project, similar choices were made in selecting younger individuals to compile the datasets. As for the female datasets in both the VK and CVH, improvements upon the VHP datasets are described as such:

The subjects were younger in the VK, VCH, and CVH than in the VHP. For example, female subjects (59 years old) in the VHP comprised regressed genital organs, while Korean and Chinese female subjects, prior to menopause, demonstrated the dynamic ovaries involving the various stages of the ovarian follicles. (Dai et al., 2012)

While the VK and CVH descriptions of cadaveric selection do not expressly maintain that the VHF has less biovalue than the female datasets the VK and CVH produce, use of words such as “regressed” and “dynamic” to compare the reproductive organs of the VHF and the VK, VCH, and CVH datasets. In addition, the use of the example of age and reproductive status, following the idea that their datasets are an improvement upon the limitations of the VHP datasets, implies that the younger, pre-menopausal female reproductive system is privileged—again, a departure from acknowledging multiple embodiments and recognizing the multiple aims inquiry may provide as pragmatic feminist empiricism suggests.

The VK and CVH also did not produce only a single male and female dataset, but a collection of several representations. In all of the datasets in the VK and CVH projects, representations are of younger embodiments which are all equipped with active reproductive

systems. The choice to privilege the active reproductive system in both female and male datasets creates discourses of health that identify the active reproductive system as complete, normal and symbolic of health. For the professional community, this privileging of the active reproductive system places more biovalue on that type of embodiment, and may also influence public perceptions of themselves and others in the way that narratives of reproductive status influence definitions of health and disease.

Public and Popular Responses to the VHF as a Model of Health

When the NLM released the VHF dataset, responses from the public and popular media privileged active reproductive status as the presentations and rationales for the SVF, VK, and VCH projects did. In 1996, *The New York Times* published the article “Research Uses Grow for Virtual Cadavers,” in which the VHF is discussed: “But the woman showed signs of heart disease, and some researchers were disappointed because she was postmenopausal and medically less relevant to younger women. ‘But I think the committee reasoned that she was as good as we were going to get,’ Dr. Ackerman said” (Grady, 1996). The article, one of many that identifies the biovalue of the VHF as being “medically less relevant” in some way based on reproductive status. According to Cartwright (1998), “The Visible Woman is represented as older, her age is linked to her sex and reproductive function, and specifically it is implied that she is menopausal” (p. 30). The identification of the VHF as being “complete” or “normal” is complicated by social and cultural values that tie reproductive status to health, which I will discuss in depth later in the chapter as they pertain to pragmatic feminist empiricism. As Doyle and O’Riordan (2002) note, “...anatomical knowledge of the female is reduced to, and signified by, her reproductive parts” historically and thus discourses of difference and value based on reproductive status have endured and have translated to models even in cyberspace (p. 239). As Grady’s 1996 article

shows, the reproductive status of the VHF is understood as a site of establishing female biovalue for the professional and public audiences.

The identity of the VHF, while her name is unknown, is always linked to her reproductive status (Cartwright, 1998; Waldby, 2003; Nayar, 2004). There is never a mention of the VHM's reproductive status in descriptions of his embodiment—name, age, and often the moniker of “convicted felon,” are applied to descriptions of the donor. The media's framing of the VHP datasets as being part of a virtual family¹⁰² also allows the critique of the VHF's reproductive status as being somehow incomplete or abnormal in its inability to be a suitable companion for the VHM (Cartwright, Treichler, & Penley, 1998; Brodwin, 2000; Waldby, 2003, 2004; Leaver, 2004). The idea of creating a family unit from the datasets also supports the narrative of reproduction that privileges an active female reproductive system and assumes active reproductive status in the male.

In 2015, the complete phantom¹⁰³ of the VHF was released. The phantom is a complete, high-resolution assemblage of the images from the VHF created for the purpose of allowing surgeons to practice procedures that are “too risky to perform on living people” (WPI, 2015). The phantom project, headed by Sergey Makarov, was introduced at proceedings of the IEEE Engineering in Medicine and Biology 2015 conference in Milan, Italy, which elicited a resurgence in headlines about the VHP—namely the VHF, the basis of the phantom. The phantom, unlike anatomical Venuses described earlier in this chapter, is rendered for the purpose of educating practitioners through engagement with real anatomy without idealizing the body to

¹⁰² The notion of a virtual family and the harm this cultural imagining can bring stems from a concept called iatrogenesis, which is defined socially and culturally as the unnecessary medicalization of life and its potential to harm self- and public perceptions of identity based on ideas that are communicated (Illich, 1975).

¹⁰³ The VHF phantom is a reconstruction of all images and scans around which is built a “mesh” digital 3D capsule that allows users to print fully dimensional copies of the dataset and manipulate them for surgical experimentation and other uses; one goal of the VHF phantom technology is to print a model of the VHF to supplement cadaveric study (Yanamadala, Rathi, Maliye, Win, Tran, Zagalskaya, Noetscher, Makarov, Kozlov, & Nazarian, 2014).

adhere to aesthetic value. Descriptions in popular media refer to the VHF in ways that negate the dataset's biovalue in terms of the way "healthy" and "normal" are framed through aesthetic value or beauty standards:

The woman whose body was donated to the project was 59 at the time of death (a heart attack) and was obese. This was actually seen as a positive for the research as obesity is a significant public health concern. The team was also able to create slimmer versions of the simulation with less skin and fat. (Whitwam, 2015)

This quote illustrates the framing of health through aesthetic values through the use of the word "slimmer" in particular to describe changes to the simulation—changes that do not accurately reflect health or disease. Other titles, such as "Visible Human Project': Scientists Cut 5,000 Slices of Obese Woman Cadaver to Create Virtual Human" by Boreli (2015) also downplay the biovalue of the dataset through characterizing the VHF donor as obese, implying that the dataset does not represent a healthy female. Yet again, the acknowledgement of embodiments that is encouraged through pragmatic feminist empiricism could aid in so many aspects of the discourses about embodiment that result from the technical communication.

Though popular media portrayed it otherwise, the donor for the VHF is never referred to as being obese in the 48 presentations that took place at the 1996 Visible Human Project® conference over nine different sessions, not including the keynote (Banvard & Ackerman, 1996). In addition, the dimensions of the VHF donor body are never mentioned. Without dimensions, which are not shared by the NLM or in other media, it is impossible to calculate the BMI of the VHF donor and determine whether or not the dataset represents an obese female. According to MedlinePlus (2016), a division of the NLM, obesity is defined by an elevated body mass index

(BMI),¹⁰⁴ which is determined based on weight, height, and age factors. Waist circumference is also a factor in determining obesity (Harvard, 2016). The average weight of American women over twenty years old, according to the CDC (2016a), is 166.2 pounds with a height of 63.8 inches and waist circumference of 37.5 inches. As a diagnostic tool functioning as a clinical gold-standard for measuring obesity, why use of BMI¹⁰⁵ would have been overlooked in screening candidates for use in the VHP is not feasible.

Obesity, while a major public health concern, is not expressly embodied in the VHF dataset—and since the VHF donor was determined to be “healthy,” it follows that her BMI was in the “normal” range based on the donor’s particular body composition—and yet the media was preoccupied with the VHF’s BMI regardless. And to further address the acknowledgement of multiple embodiments served by technical communication, a pragmatic feminist empiricist approach to creating inclusive definitions of health and disease would also acknowledge the biovalue of bodies that are marked as “obese” in the design of technical communication, especially since obesity is a public health concern.

Social and cultural values are reflected in discourses about embodiment of health—both in privileging not only embodiments of active reproductive status, but those embodying the concepts of beauty standards as they relate to discourses of what constitutes health or normality. The media chose to focus on visual perceptions based on social and cultural constructs of what constitutes obesity rather than to consider the clinical definitions of obesity based on an elevated BMI. Part of the media’s assumptions were based on discolorations resulting from disruptions in

¹⁰⁴ According to the Harvard School of Public Health (2016), the following method is used to calculate BMI: “Divide a person’s weight in pounds by height in inches. Divide the answer by height in inches. Multiply the answer by 703. Metric: Divide a person’s weight in kilograms by height in meters. Divide the answer by height in meters.”

¹⁰⁵ While BMI is used to calculate obesity, its effectiveness has been critiqued, but “Research has shown that BMI is strongly correlated with the gold-standard methods for measuring body fat” and is recommended by the CDC, WHO, and NIH (Harvard, 2016).

the freezing process that impacted tissues in imaging. While the silhouette of the VHF appears to show a thick band of white in color images, this is not necessarily fat, but nerves, which show up the same color as fat in digital images of the VHF as a result of the freezing technique used to prepare the body for cryosectioning (NLM, 2016b). Apart from discoloration that may distort the uninformed viewer's perception of the VHF's physical appearance, flattening and displacement of the skin and underlying tissues during the preparation process also makes it impossible to determine visually if the VHF donor was obese. Spitzer and Whitlock (1998) describe the process of freezing the subjects lying flat on their posteriors, which flattens the buttocks and spine and allows the tissues to spread horizontally. But the media used discolorations to mark the VHF as "obese" and criticize the specimen in attempts to devalue embodiments that seemed—because the construct of obesity was not necessarily accurate—to deviate from social and cultural values of health and normality.

Moving Forward in Expanding the VHP

Choices in which types of embodiment to represent first in the development of the VHP have shown that there is power in the datasets as examples of technical communication that may create, reflect, and also transform discourses of health and disease. In order to expand and to represent more types of embodiments, the project developers must acknowledge embodiments and consider the future impacts of design in the continuation of the VHP. Pragmatic feminist empiricism is a methodology through which one may analyze the development of the VHP as technical communication and an intervention tool for expanding the VHP to incorporate and present embodiments that yield more inclusive definitions of health and disease to influence professional and public discourses. Using the three tenets of pragmatic feminist empiricism, I will discuss the development of the VHP and how embodiments have been acknowledged, as

well as how the developers of the project have envisioned the impacts of the project on future knowledge about health and disease.

Acknowledgement of technical communicator embodiment. The selection of bodies that would become the VHP were made based on specific criteria of health and wellness listed earlier in the case study. As far as applying the criteria to the candidates for the project, a committee of individuals from the University of Colorado at Denver along with representatives from the NLM participated in the selection process. As professionals working in academic research departments and authoritative medical institutions, the acknowledgement of embodiments of the technical communicators who selected the bodies and proceeded to represent them through the collection of data comes only in the form of institutional ethos and credibility.

One example of the expression of the embodiment of institutional ethos can be found in writings on the project by the VHP's founder, Dr. Michael J. Ackerman. Ackerman, the originator of the idea of the VHP, worked for the NLM as a biomedical engineer in the Office of High Performance Computing and Communications (NLM in Focus, 2014). In his own writings about developing the project, Ackerman adopts a strategy of expressing the narrative of the development of the project as an NLM initiative—he does not use the first person pronoun to link himself directly to the project (Ackerman, 1992, 1995, 1999; Ackerman & Banvard, 2000; Ackerman, Yoo, & Jenkins, 2001). Through this rhetorical choice, Ackerman allows his writing and his idea for the VHP to embody the institutional ethos of the NLM. The NLM, then, as the source of the VHP, as an institution of medicine may be read through the lens of centric epistemologies that I have discussed in Chapter II, where the institution itself projects its definitions of health and disease that are the result of the history of medical institutionalization onto its technical communications.

On its website, the NLM (2016a) states the following regarding its own institutional history as an authoritative source on public health:

The National Library of Medicine (NLM) ... has been a center of information and innovation since its founding in 1836. The world's largest biomedical library, NLM maintains and makes available a vast print collection and produces electronic information resources on a wide range of topics that are searched billions of times each year by millions of people around the globe.

As an authority working on both a national and global level to produce information and technology to aid in the study of public health, the NLM must acknowledge the rich history of medical epistemology when determining what values are the most important to stress regarding health. For this reason, the NLM and its researchers must take special care to acknowledge the various embodiments of the populations they serve through their technical communications.

Acknowledgment of embodiments represented and served by the VHP. The NLM 175th Anniversary website (2011) states that the mission of the NLM's research initiatives is to "...serve the world by supporting scientific discovery, clinical research, education, health care delivery, public health response and the empowerment of people to improve their personal health." The stress on the aspect of public health is made apparent on various NLM pages—including a section on its main page entitled "NLM for YOU," which is directed at the public audience of internet users (NLM, 2016a). On its official VHP website, the NLM (2016b) states that its goal in developing the project is "...an outgrowth of the NLM's 1986 Long-Range Plan. It is the creation of complete, anatomically detailed, three-dimensional representations of *the* [emphasis mine] normal male and female human bodies." The use of "the" to describe the embodiments that the NLM seeks to represent through the VHP datasets is a bit non-inclusive in

that it assumes that standardized embodiments of “male” and “female” do exist and can be represented in one model. The use of the language “Long-Range Plan,” however, implies that the VHP will expand, which may account for the addition of more embodiments to the datasets, though this acknowledgment is unclear for the lay audience who might read the description of the project and begin to base ideas of health upon the VHP as technical communications of health status.

As I have demonstrated in the analysis of responses to the VHF, discourses of reproductive value differ along both professional and public lines. These discourses can often be non-inclusive and in some instances damaging. The representation of a standardized, normal, and healthy female body in the VHP, based on the mission of the NLM to serve the public, although a challenge to public and other professional discourses of reproductive value, is not entirely inclusive as “*the*” healthy female body. The VHF is indeed, by clinical definition, *a* healthy female body, but cannot possibly represent all female embodiments of health as “*the*” body. Average, healthy female bodies may exist in many different stages of reproductive development.

This same reasoning may apply to the VHM—while I have not devoted analysis to the reproductive or other values in male embodiments, the same argument might also apply for a male reproductive system in a state of andropause.¹⁰⁶ The male embodiment of active reproductive status, based on social and cultural as well as medical institutional values, is also a non-inclusive representation of a healthy, normal male body. Like menopause in the female reproductive system, andropause also ceases fertility and may also bring about changes in other system functions, but these changes are not always damaging or pose a threat to the well-being of the individual. Andropause is a slower process than menopause, and has less social and

¹⁰⁶ Also known as “male menopause,” andropause is signaled by a decrease in testosterone that may impact virility and bring about other changes in the male body, though androgen decline in aging men (ADAM) is not routinely measured in the United States (Comite & Baek, 2013).

cultural visibility in that it is not treated as a condition necessitating medical interventions such as hormone replacement therapy (HRT).¹⁰⁷ Unlike menopause, andropause is not defined clearly by the medical community, and age is not necessarily tied to its onset as clearly as menopause.

Again, while the VHP represents two examples of healthy male and female representations of embodied clinical criteria of health, the language of the VHP's description and goal is non-inclusive in its assertion that the VHF and VHM as technical communication are fully capable of representing all the embodiments they are meant to serve through their study. While publications about the VHP note that it will expand and that it is part of a "long-range plan," the presentation of the VHM and VHF as sites for developing clinical gold standards in their embodiments are not entirely inclusive and their value and limitations should be taken into consideration in how they are presented as authoritative sources on "*the*" embodiment of health as opposed to *an* embodiment of health. As a project that is meant to reflect and serve the public, being clear about expansion may help to demonstrate the value in differences and to create more discourses about these differences in health that are more inclusive.

Acknowledgement of multiple aims inquiry might serve. If the VHP is meant to set standards for embodiments of health in both the professional and public realms, the discourses produced by the datasets as they are presented (i.e. as "*the*" standard, "normal" embodiments of male and female health) should make clear that they will be expanded, as the founder and principal investigators of the project at the NLM make clear in their professional writings regarding the project. While other iterations of visible female reproductive systems in the professional setting privilege and reflect the medical and overall social and cultural narratives of

¹⁰⁷ Hormone replacement therapy, once thought to prevent the onset of heart disease and memory loss, is defined by the Mayo Clinic (2016) as "medications containing female hormones to replace the ones the body no longer makes after menopause — used to be a standard treatment for women with hot flashes and other menopause symptoms."

the active reproductive system as having the most value to the study of women's bodies through discourse, the VHF dataset as an embodiment of health and normal function challenges these narratives and creates an opportunity to challenge this historical value. The biovalue of the VHF is implied through the choice of donor for the VHP, and is made even clearer in the discussions of biovalue of different types of embodiment by figures such as Ackerman, Spitzer, and Scherzinger.

Even if the VHF had been accepted without commentary or criticism by professional and public media, its reception still shows that one's health does not decline or disappear when the reproductive system moves past childbearing years and undergoes changes. As a woman with an active reproductive system, the VHF may not necessarily show me exactly what my own general health and reproductive anatomy should look like right now, but what health may look like when I am 59-years-old and postmenopausal. For someone else whose embodiment may match the VHF more closely, the reproductive aspect of health and what is "normal" may be a good place to use the VHF dataset as a clinical gold standard of health.

On the other hand, a comparison of differences between my reproductive system, for example, and that of the VHF may also be useful—especially as my reproductive system (and my body in general) changes as I move through different stages of life and come into contact with external factors that may impact my health (e.g. climate changes, chemicals, traumas, contagions). The same argument may also apply for the VHM as a site of comparison—the biovalue of the VHM dataset is still useful for studying disease and anatomical function in organ and other systems that may define health and disease differently between sexes. Personally, I can recognize that the current VHP datasets are both useful to me, even though their embodiments may not necessarily correlate specifically to mine.

As technical communication, the VHP does impact the way discourses of health and disease are formed. The findings in the VHP have already influenced new projects and altered the way anatomy has been understood in some ways (i.e. corrections to prior knowledge about anatomical structures). Medical textbooks, which I will discuss in Chapter IV, and their depictions of anatomy that are bound by institutional, social, and cultural values, are one area that has been influenced by the VHP as technical communication. While the discourses resulting from the project—including the reproductive status of the VHF that I have shown in this chapter—seem to criticize the project at times and react with improvements (i.e. the SVF, VKF, and VCF), these inquiries are not necessarily negative. These inquiries only serve to continue the work the VHP intends to do—to expand and to include different types of embodiment in order to visualize and communicate information about bodies that will positively influence public health worldwide. In fact, more conversations and recognitions about sites of difference should happen—the discussion is productive and may help to fuel research into new discoveries about the embodiments of health and disease that are currently accepted as epistemologies upon which definitions and treatments are based.

If the VHP continues to expand as planned, there is the potential to acknowledge differences and subsequently acknowledge value by selecting cadaveric specimens that embody various aspects of health and disease—including reproductive health. In expanding the project to include representations of different races, ages, and sex variations, the VHP as technical communication has the power to create more inclusive definitions of health and disease. Rather than just a repository for anatomical study, the project as an authoritative source on anatomy and physiology impresses notions of value onto the bodies that interact with it.

Moving Forward in Expanding the VHP as Technical Communication for More Inclusive

Definitions of Health and Disease

I have shown in the previous section how pragmatic feminist empiricism as an intervention tool may improve the expansion of the VHP in that it will require developers to fully consider the embodiments of all who are represented and served by public health. Pragmatic feminist empiricism also helps developers to consider the impact of choices in design of the expansion in how the VHP datasets will influence the future of medical education and both professional and public perceptions of health. In analyzing the values reflected in discourses of reproductive status and how they are challenged in the VHF as well as professional and public media responses, it is clear that intervention is necessary in future expansion of the VHP. While professional and public media responses to the biovalue of the VHF are based on sex and appearance, feminist inquiry allows the question of why and how these discourses influence definitions of health and disease to open up a conversation about how values are established and how they endure.

The VHP as technical communication, if expanded through the acknowledgment of embodiments and consideration of the multiple aims it may serve, has the potential to create more inclusive definitions of health and disease through an expansion of values in sex, gender, ethnicity, and other embodiments that impact health and personhood. The goal of the VHP as a long-range project is to expand—if the project does not expand, there remains a risk of allowing values to be determined by the two datasets currently in use. A stagnation of medical discourse in both the professional and public realms may result in backpedaling from the goal to expand and instead restricting value. With projects such as the SVF, VK, and VCH, however, the risk of

restricting value is lessened, though the presentation of these projects should not be executed in a way that lessens the biovalue of the current VHF datasets.

An expansion of values, nonetheless, is made manifest through the VHP, which as an authoritative source of anatomical knowledge demonstrates biovalue for those represented and served by public health. In early philosophy, and especially in medical circles of the eighteenth century, a popular creed for researchers was “Nosce te ipsum”—Latin for “Know thyself.” But how do we come to know ourselves? We rely on experiences, mediated through our bodies. We experience through our senses, through our understanding of others, and through the ways we are told to understand the world. The VHP can do this—as technical communication, the project already has transformed aspects of value that may influence embodiment and selfhood. If the project expands carefully through acknowledgement of embodiment and through consideration of multiple aims, the VHP can make medicine, society, and culture more inclusive through the discourse it creates. The VHP can help anyone “to know thyself” better, even through the presentation of different embodiments. To know thyself is to know many—the people who engage with us, and the people who have authored the world through which we are mediated.

CHAPTER FOUR

The Application of Pragmatic Feminist Empiricism in Analyzing and Revising Anatomical Illustrations in Popular Medical Textbooks

The first two chapters of the dissertation identify exigencies in medical technical communication and justify the need for pragmatic feminist empiricism as a rhetorical intervention tool. In Chapter III, I apply pragmatic feminist empiricism to an analysis of the National Library of Medicine's Visible Human Project® (VHP) and its rhetorical power to impact value and challenge discourses of health and disease. Chapter IV will begin with a historical overview of anatomical illustration through which I will identify values that inform discourses of health and medicine. In addition, I will analyze a selection of popular medical textbooks through pragmatic feminist empiricism, including one popular text which derives its visual representations solely (in the case of the male specimen in the text) from VHP imaging.

In order to understand the exigencies that I identify in Chapter I and to use pragmatic feminist empiricism effectively, understanding context and history through deep research is vital. The historiographic approach I chose to take in Chapter III contextualizes three-dimensional medical modeling through historiographic work—this chapter will do the same by offering a history of anatomical illustration as an institution formed from social and cultural values.

Applying pragmatic feminist empiricism, I argue in Chapter IV that values shaped by centric epistemologies are created and reflected through anatomical illustration. These values, if left unquestioned, may pose risks to the way bodies are understood for both professionals and members of the public. In my application of pragmatic feminist empiricism in this chapter, I explore approximately 2,500 images to demonstrate the need for rhetorical intervention. I demonstrate through analysis that pragmatic feminist empiricism, when applied to the analysis of

anatomical illustrations as technical communication, provides an opportunity to call into question prevailing discourses of health and disease embodiment and values regarding biological sex. Calling these values into question may lead technical communicators to develop more inclusive models and may also transform discourse in such a way that centric epistemologies may be challenged and expanded, thereby improving future medical knowledge.

Pragmatic feminist empiricism, in its effort to become a tool for critique in addition to design, benefits from historical context in order to provide its users with grounds for critiquing prevailing discourses of health and disease in order to transform them to become more inclusive. In the first part of the chapter, I will explore the history of anatomical illustration both in and outside the Academy, theories of anatomies that both support and are supported by social and cultural discourses of power that marginalize certain embodiments, and influential writings that have influenced current discourses. This information is critical to the application of pragmatic feminist empiricism to challenge the discourses that are created by the technical communications in the anatomy textbooks I analyze in the second portion of the chapter.

A History of Anatomical Illustration and Early Anatomy Textbooks

In early medical programs dating back to as early as the 11th and 12th centuries in Italy, anatomical illustration was a required course for students. Medical education during this time took place on paper more often than in actual practice, where copying illustrations produced from descendants of Galen's treatises on anatomy were the primary means of learning about bodily structures. The sciences, including medicine, dominated by men, continued to practice the motto of "knowing thyself."¹⁰⁸ Practitioners studied the works of the men who came before them, works that embodied what they thought must be reflections of themselves. The practice of

¹⁰⁸ "Nosce te ipsum," the motto of early Renaissance philosophers and physicians, particularly those working in the sciences.

“knowing thyself,” while it relates directly to one of the tenets of pragmatic feminist empiricism, does not an inclusive epistemology make when its “truth” is applied to aspects of experience or understanding that impact the public. In the case of medical discourse, “knowing thyself” as the mantra for those working in the field without acknowledging or valuing differences in other embodiments made for a skewed and androcentric foundational epistemology for those practicing and learning from anatomical models and treatises put forth by predecessors in the field. The influence of men who dominated the academy, thus, allowed the institution to embody primarily the values of themselves, and in medicine, the effects of this institutional embodiment of male-centered research and value became recursive and is reflected uniquely in both professional and public discourses of health.

An academic challenge¹⁰⁹ to Galenic medical discourses on anatomy which were part of institutional education programs was posed by Antonin Vesalius. Before the Renaissance period, which began around 1300, Galenic discourses of medicine were the accepted foundation for all medical treatises. Historians frequently identify Vesalius as the writer of the first anatomy textbook, though the first anatomical book with illustrations was written in 1491 by Sebastiano Manilio of Ketham¹¹⁰ in Venice. The Vesalian text *De Humani Corporis Fabrica* was published in 1543, and is labeled as the first anatomical textbook because it critically challenged Galenic medicine in its approaches to anatomy. Though Vesalius is usually given complete credit for the *Fabrica*, the illustrations themselves were not completed¹¹¹ by him, but by the artists Jan Calcar

¹⁰⁹ I use the phrasing “academic challenge” to distinguish between institutional contemporaries and those outside of the academy, which I will describe in the next section.

¹¹⁰ Ketham wrote *Fasciculus Medicinae* in Venice—the first book full of illustrations accompanied by text (Persvad, 1984).

¹¹¹ Jan Stephen Calcar (1499-1546) is known for his development of what is called “flap anatomy,” where the folds of the skin are pulled back to reveal what is inside (Feyfer, 1933).

and Titian.¹¹² Titian's school of artists working in Italy rendered the dissections and labeled figures according to the instructions of Vesalius (Feyfer, 1933; Saunders and O'Malley, 1982). It is important to note that many texts like the *Fabrica*, while they are attributed to one individual, are collaborative pieces, which means that multiple male embodiments were at work on the texts and reflect the influence of cultural, social, and institutional values on the work. Vesalius and his team of collaborators, then, were not the first to produce anatomical illustrations by any means, but the *Fabrica* was the first text to transform foundational discourses in both education and public health for modern medical practice.

What set the *Fabrica* apart from other texts was a combination of kairos and Vesalius's own personal commitment to achieving rhetorical velocity. The availability of the printing press to mass produce and distribute the *Fabrica* aided in establishing its influence on medical discourses and on the academy in Europe. In addition, the anatomist himself had challenged practices in dissection, being the first in his field to publicly demonstrate a dissection solely by his own hand.¹¹³ The notoriety of Vesalius through public demonstrations in the anatomical theatre and his open challenges to Galenic anatomy¹¹⁴ automatically gave the anatomist more ethos for the public and for his contemporaries, which also created appeal and veracity for the *Fabrica*. As a technical communicator, Vesalius achieved rhetorical velocity in transforming medical discourses about anatomy and physiology. The *Fabrica* became so popular that plagiarized copies began to emerge, which were also dispersed efficiently through the printing press (Petherbridge & Jordanova, 1997). Through the spread of the original text, plagiarized

¹¹² Tiziano Vecelli (1488-1576) was an Italian painter and one of the most influential painters of his time. He is best known for his altarpieces and his work in the Venetian School (Metropolitan Museum, 2016d).

¹¹³ In the dissection theatre, the anatomist never worked with the cadaver. He sat in a high chair behind a podium and lectured from books as an assistant cut into the body.

¹¹⁴ As I mention in Chapter III, Galen used animals to study anatomy because the dissection of humans was forbidden. He used animal anatomy as a comparison to people's bodies and justified through his observations of skeletons that this was not a farfetched comparison.

copies, and the notable influence of Vesalius, Galen's reputation suffered along with his followers' and his work, which had been the foundation of medical discourse for centuries, was soon replaced.

To “Know Thyself” inside and outside of the Academy: Oppositional Readings from Varying Perspectives

The frontispiece of the *Fabrica*, like most anatomy books in the 1500s following Andrea Mantegna's¹¹⁵ first illustration of dissection lectures in 1493, depicts a dissection in progress. Vesalius holds a scalpel in hand and is dissecting a woman in the middle of the theatre with a crowd of men looking on as he works. The rhetorical implications of the positionality of the woman's body being dissected in relation to Vesalius and the men observing demonstrate how the field was dominated by men. Even though the woman is being dissected in the image, what the men are looking for is, alas, themselves—to once again “know thyself.” As Vesalius dissects, he gestures to the men, appearing to narrate the process. What they learn is what Vesalius tells them they are seeing, as in the dissections of bodies before Vesalius, where the lecturer would read from Galenic texts and the assistants would corroborate.¹¹⁶ The point is that when an entire epistemology is accepted with little question, elements of discourse and the embodiment of the technical communicator are going to guide and direct the viewer or reader to a “truth” presented through the design of the technical communication—a reinforcement of discourse through circular logic. In the case of Vesalius and any other technical communicator who composed an anatomy textbook, their biases, no matter whether they are taken into account, will act as a vector in showing or telling the viewer what is important. In addition, and counter to pragmatic feminist empiricism, these technical communicators in seeking to know themselves viewed their

¹¹⁵ Andrea Mantegna (1431-1506) was an Italian painter and known for his work in printmaking in Venice (Metmuseum, 2016b).

¹¹⁶ I use the word “corroborate” more in a sense of agreement or not challenging the assertions of the lecturer.

subjects through a single lens: the lens of their own embodiments. While their viewpoints are not invalid, their perspectives are severely limited in their inability to identify truths through multiple lenses.

In a field dominated by centric epistemologies, then, with an entire discourse of medicine based on men seeking to know themselves by observing others, the idea of the male body as a standard for all other embodiments was perpetuated (as I note in previous chapters). While challenges to Galenic treatises were not recognized by medical practitioners until the publication of the *Fabrica*, there were, however, pre-Renaissance technical communicators who commented upon anatomical differences but were not accepted as medical authorities. One of the early pre-Renaissance medical technical communicators who I would argue practiced the tenets of pragmatic feminist empiricism explicitly in her writing was Hildegard of Bingen,¹¹⁷ a polymath and abbess writing and illustrating in the 12th century. In her work entitled *Causae et Curae*, Hildegard notes the differences between embodiments (though she only distinguishes between male and female and does not account for intersex embodiments) regarding the treatment¹¹⁸ of certain conditions (Glaze, 1998). As part of the structure of *Causae et Curae*, Hildegard also, apart from acknowledging the embodiments of the individuals who may receive treatments based on her instruction in the texts, acknowledges herself as a source of information. The first book of *Causae et Curae* notes how she communicates with God and experiences “visions” in addition to how she sees herself positioned in the universe as a woman, abbess, and physician. She prefaces the set of books with a note on how the relationship between humans and nature must be understood and acknowledged in order to maintain stasis for the future: “Everything that is in the

¹¹⁷ See Rauch’s (2012) “Accreditation of Hildegard Von Bingen as Medieval Female Technical Writer” for more information regarding the legitimization of technical writing as a profession in the Middle Ages and how Hildegard should be recognized as a technical writer based on criteria.

¹¹⁸ Hildegard practiced humoral medicine, though unlike Galenic medicine, she differentiated treatments for her patients based on sex.

heavens, on earth, and under the earth is penetrated with connectedness, penetrated with relatedness” (Hildegard, 2010, p.iv). This note on the interconnectedness is Hildegard’s idea of the world as a macrocosm and the human body as a microcosm,¹¹⁹ which is a system theory¹²⁰ relating biological systems through interaction. Hildegard’s examination of the world as macrocosm and body as microcosm demonstrates her acknowledgement of how there are multiple aims to her inquiry in *Causae et Curae*—a clear demonstration of the third tenet of pragmatic feminist empiricism, where one must consider the potential future impact of the technical communication when it is accessed by new audiences.

Apart from her writing about anatomy in *Causae et Curae*, Hildegard also illustrated her vision of the creation of the universe and the world within it in her first work entitled *Scivias*,¹²¹ in which she posits that an egg is the origin of all things. The “cosmic egg” of Hildegard, which resembles both an egg and female genitalia, is possibly an embodiment of her own physical attributes in addition to her experiences of the world (Glaze, 1998). Before Hildegard and for many years after, life was believed to have originated from semen as opposed to an egg—an idea put forth by Aristotle, Galen, and other anatomists thereafter who published in academies of philosophy and medicine. Interestingly, Hildegard was actually the first person to theorize the egg as origin point of life, a physician named William Harvey¹²² was credited with the idea in the 15th century.

In addition to the writings and illustrations of Hildegard, other texts outside of the academy before the Renaissance also depart from the androcentric model of treatment and

¹¹⁹ “Microcosm” in terms of the body refers to the notion that the workings of the organs and systems within the body are structured similarly to the workings of other systems.

¹²⁰ “System theory” is a way to explain organizational and working principles that explain the existence of certain phenomenon. In the case of Hildegard and the body as microcosm, its workings were a reflection of the universe.

¹²¹ The title “Scivias” is taken from the Latin “Sci vias Domini,” which means “To know the ways of the Lord.”

¹²² William Harvey (1578-1657) was an English physician who was the first academic scholar to theorize the egg as the origin of life (Lacquer, 1995).

representation of embodiments. Also working in the 12th century, an Italian woman technical communicator known only as “Trota of Salerno” produced several texts related to the anatomy and physiology of women as well as treatments for ailments particular to women’s bodies. In her three-text manuscript, known as *Trotula*,¹²³ Trota describes how women’s bodies’ needs differ from those of men (again, like Hildegard, Trota uses a binary system of classifying sex) based on anatomy and physiology and treatment including notes on anatomical structures such as uterine movement (Benton, 1985; Green, 2001). Much of the texts refer to Galenic medical theories and also describe Arabic theories on how to treat various ailments in women. Trota’s work, like Hildegard’s, also picks up more elements of pragmatic feminist empiricism in her ability to look at different embodiments, acknowledge them, and consider the future implications of her work. Like Hildegard, Trota did not receive a great deal of recognition within the academy, though her text was used in the informal Salerno medical circles during the 12th century. Interestingly, the frontispiece of *Trotula* depicts only Trota herself, holding a shining orb—perhaps a nod to a healing gift as a divine providence.

Though Hildegard and Trota wrote outside of the academy and preceded Renaissance scholars like Vesalius, their works offered a more inclusive picture of anatomy in that they included more information pointing to a recognition of value in difference in order to serve more diverse embodiments—even in *Trotula*, a tome meant for women, there is acknowledgment of male embodiments as a site of difference regarding treatments. The presence of women’s embodiments marks the difference in Hildegard’s and Trota’s texts from those of technical communicators in the formally institutionalized academies of medicine. Hildegard, an abbess, lived in the company of women and though she wrote letters frequently to the Pope and to others

¹²³ “Trotula” acted as both the title of the collection of works by Trota of Salerno and was attributed to Trota as her name.

outside of monastic life, her position in the world allowed her to acknowledge embodiments of women like her own where a value was placed on knowing the ways of female embodied experience. Likewise, Trota practiced medicine in an informal group of like-minded individuals in Salerno which allowed her to both acknowledge and value difference.

Female Embodiment as Secondary to the Male Standard

In identifying the origins of the androcentric model, it is necessary to once again look to Galen's work as the foundation for anatomy and physiology. Galen's notion of difference between the anatomies of sexes was drawn from the work of Aristotle, who posited that the reproductive structures of male and female sexes mirrored one another. For Aristotle, the male was the active leader and primary extension of the gods while woman was "irrational" (Lange, 1983; Tuana, 1994). To justify the marginalization of women, Aristotle used a biological argument to determine that women's bodies are derived from those of men and that the female body is only useful in reproduction as a vessel for carrying and nurturing the fetus. The male structures of the body for Aristotle were the means by which life were given—meaning that all life originated from sperm implanted from the male into the female.¹²⁴ In Aristotle's binary classification system of sexual differences in both the biological and social realm "male" and "female" are binary opposites, hence their structures are opposing as well.

To support the notion of mirrored structures, particularly in the reproductive systems in ancient times, some of Galen's depictions of the reproductive structures illustrate the uterus, for example, to have "horns." This description of the uterus is based on the examination of the male structures and merely flipped vertically, where the horned uterus is referred to in historical

¹²⁴ As both Hildegard and Harvey point out, the egg is the origin of life. It is within the egg that the mitochondrial DNA, the blank cell upon which directions for development is written, that life begins upon fertilization from sperm cells.

medical scholarship as the “bicornuate uterus.”¹²⁵ In keeping with the idea that illustrations of anatomy and the discourses they reflect are influenced by institutional, social, and cultural values, Deslauriers (2009) argues that the political system of Aristotle’s time, which influenced Galen’s practice, is the root of his justification for the repression of women, not the biological system. Artistic representation of embodiments, then, have long been influenced by multiple factors and have the power to create, reflect, and transform discourse to shape values. To work across these factors that influence biases and reinforce both privilege and marginalization, a pragmatic feminist empiricist approach must be applied to artistic representation to create more inclusive discourses of health and disease embodiments.

In the Renaissance academy, the first dissection of a woman’s body took place under the supervision of Mondino de Luzzi¹²⁶ in 1315. During the dissection, Mondino read from Galen’s text to describe the entrails for his audience in the anatomical theatre. Though he said that he dissected bodies to create woodcuts for anatomy books he had written, that he ever actually dissected at all is debated among scholars (Petherbridge & Jordanova, 1997). In addition, through the images he created for his text *Anathomia Mundini*,¹²⁷ written in 1316 and published in 1478, Mondino illustrates an anatomy supportive of Galen’s notions of binary sex systems of male and female, where female structures are deviations of those of men. As a follower of Galen, his reputation was also ruined with the publication of the *Fabrica*.

¹²⁵ In contemporary medicine, “bicornuate uterus” or “heart-shaped uterus” is a condition in which the uterus is divided by tissue, causing it to appear to have horns. Galen and his followers believed that every uterus was bicornuate, because female reproductive structures, they believed, were inversions of those of men.

¹²⁶ Mondino de Luzzi(1270-1326) was famous for publicly dissecting cadavers, a practice which had been disbanded many years before, earning him the title of “Restorer of Anatomy” (Persvad, 1984).

¹²⁷ *Anathomia Mundini* was so popular upon publication that many universities used it as a primary education tool for aspiring physicians (Carlino, 1999)

The One-Sex Model Approach to Anatomical Representation

Laqueur (1990) in *Making Sex* identifies the origins of what he refers to as the “one-sex model” of anatomical representation, where the male body becomes the origin point for the representation of all embodiments. Based on the Aristotelian and Galenic notions of the female body as a derivation of the male with its bicornuate uterus and “internal penis,” there was, according to Laqueur’s research, the existence of only one sex. Those who exhibited an external penis were granted privileges and rights based on the ability to “be a father, which is to be the author of life” (Laqueur, 1990, p. 135). Laqueur argues in the one-sex model that gender is based on nothing in particular but is justified by the notion of whether the penis is internal or external. The bicornuate uterus, then, endured through the late Renaissance even though dissections of women’s bodies took place. And not only was the female body imagined as having an internal penis, but in some texts the uterus was envisioned as the scrotum (Laqueur, 2007). Petherbridge and Jordanova (1997) note that “The persistence of such notions suggests that there are not visual ‘truths’ in imaging so much as culturally constructed representations” (p. 50). Again, societal values act as the influence upon the design of anatomy in order to reflect those values; in turn, the illustrations of anatomy also work to re-inscribe these values through the discourses they create.

The homology¹²⁸ of the male and female structures early in the foundations of science and medical disciplines form the androcentric models upon which representations are based.

Laqueur (2004) writes:

The history of the representation of the anatomical differences between man and woman is thus extraordinarily independent of the actual structures of these organs or of what was known about them. Ideology, not accuracy of observation, determined how they were

¹²⁸ “Homology” is the comparison of two items which offers an explanation of one in terms of the other.

seen and which differences would matter . . . Renaissance ‘common sense,’ and critical observation directed against the view of woman as man turned outside in, failed to make a dent in the one-sex model. (p. 88)

The one-sex model, though later debunked in favor of a two-sex model which is itself problematic, was the result of what Laqueur (2004) refers to as “seeing as,” where the viewer looks for a certain phenomenon and is able to lay those values upon the subject, resulting in a transformation of identity for the subject (i.e. woman as inverted, lesser than man). When the technical communicator fails to acknowledge the embodiments of others and themselves in addition to the examination of future aims the inquiry might serve, then the notion of “seeing as” has the power to create and reflect discourses rooted in value-based construction that are not inclusive of multiple embodied experience. Constructing women as inverted men both reflects societal values associated with gender roles and helps to justify prevailing discourses that marginalize women’s experiences and social power.

In the works of illustrators the inscription of gender onto sex influences the discourses that result, framing the male body—particularly the white male body¹²⁹—as the standard from which all representations should be derived. As I will show later in the chapter through an application of pragmatic feminist empiricism to anatomy textbooks, the male body continues to be granted privilege in revealing “truths” about bodily norms and, in many cases, continues to be the standard embodiment for teaching medicine and defining health and disease for professional and private audiences.

¹²⁹ Though race and ethnicity are not the primary focus of my work in the dissertation, pragmatic feminist empiricism is a framework that can offer a way to call discourses that disempower certain race groups into question and offer ways for technical communicators to consider the value of differences in race to improve communications.

Artistic Values and Influence on Creating Perfect Forms

Medical illustrators, under the auspices of the anatomists and physicians with whom they published representations of embodiments from the 1500s onward, were part of perpetuating the male body as standard in response to institutional, social, and cultural values. In addition to perpetuating a male standard for representing health norms, as artists, medical illustrators were influenced by values in their own profession; these values again run counter to acknowledging and valuing differences as pragmatic feminist empiricism requires. In the 1500s, Albrecht Dürer¹³⁰ made popular the idea of achieving relative symmetry¹³¹ in art which stressed the importance of perfection and proportion¹³² to achieve ideal human forms. This view of perfection and proportion was reflected in the depictions of embodiments in anatomical textbooks that would meet ideal standards of beauty as valued by the artist. By the 1700s, relative symmetry gave way to a new idea of perfection that could be achieved through the use of a gridding technique which Dürer as well as other old masters such as Jan Vermeer¹³³ made popular. Bernard Siegfried Albinus¹³⁴ and Jan Wandelaar¹³⁵ were anatomists working in the mid-1700s to use the gridding technique in medical illustration, which encompassed the use of a rectangular frame strung with vertical and horizontal strings through which the illustrator could view the subject and transfer the view from each grid square to a corresponding grid square mapped onto the drawing page. Both Albinus and Wandelaar would then manipulate the images achieved from

¹³⁰ Albrecht Dürer (1471-1528) was a German painter and printmaker during the Renaissance (Metmuseum, 2016a).

¹³¹ "Relative symmetry" refers to the use of artistic measurement of objects and perspective to make larger objects appear closer to the viewer and smaller objects to appear further away (Petherbridge and Jordanova, 1997).

¹³² "Proportion" refers to the relationship between the sizes and scale of parts of an object as they comprise a whole (Jirousek, 1995).

¹³³ Jan Vermeer (1632-1675) was a Dutch master known for his work during the Golden Age (Metmuseum, 2016c).

¹³⁴ Bernard Siegfried Albinus (1697-1770) was an anatomist known for the use of detail and creating artistic representations beginning with the skeleton (UVA, 2007).

¹³⁵ Jan Wandelaar (1690-1759) was a painter and engraver from the Netherlands who worked exclusively with Albinus (Petherbridge and Jordanova, 1997).

the use of the gridding technique to mold their subjects to fit cultural and social ideals of beauty (Petherbridge and Jordanova, 1997). The medical illustrator, then, could be responsible for the dispersal of not only values in medical fields, but values in art and aesthetics regarding ideal appearances.

The idea that so many values in illustration influence the cultural and social depiction of anatomized bodies is supported by the way the term “atlas” is used to describe anatomy texts. Anatomy atlases are maps of the body—yet they are also mapped upon bodies where values in professional fields influenced by institutional, social, and cultural factors are placed upon representations. The technical communicator, the metaphorical cartographer, draws upon experiences of working and living to map the body. These experiences are shaped by professional guidelines and elements of the technical communicator’s own embodied experience of social and cultural values. Values become both the medium that creates the technical communication and the message in what they signify. This mapping of values onto representations creates discourses that may help some, but marginalize or disempower others, as I demonstrated in Chapter III when discussing scientific racism and Saartjie Baartman. The first theories that supported scientific racism were those of evolutionists Samuel Thomas Soemmerring¹³⁶ and Georges Cuvier¹³⁷ in the mid-1700s. They used the concept of facial angles,¹³⁸ demonstrated in an art lecture by physician and anatomist Petrus Camper,¹³⁹ to determine white racial superiority and justify the mistreatment and disempowerment of people of

¹³⁶ Samuel Thomas Soemmerring (1755-1830) applied Camper’s method to a series of dissections in African villages (Spencer, 1997).

¹³⁷ Like Soemmerring, Georges Cuvier (1769-1832) also used Camper’s method to justify evolution through comparative anatomy, splitting the heads of various animals and measuring their angles to order races based on their closeness to the animal dimensions (Spencer, 1997).

¹³⁸ The measurement of facial angles entailed a three-dimensional process of correlating the “spatial arrangement of the parts” of a human or animal (Visser, 1985).

¹³⁹ Petrus Camper (1722-1789) was an anatomist and physician who studied comparative anatomy. With a pension for fine art, he often lectured students on principles in proportion (Lynn, 2002).

African descent. In his lecture, Camper demonstrates that facial angles differ among races and identifies common angle measurements for a variety of embodiments. While he did not support the use of his findings to justify racism, Camper's research was used by Soemmerring and Cuvier. Soemmerring and Cuvier applied the concept of facial angling to correspond to animal measurements, positing that certain embodiments were closer in stages of evolution to animal species. This ordering was used to label certain embodiments as less intelligent and less entitled to basic human rights.

The mapping of social gender values onto medical illustrations can also be seen in the works of artists such as Jan Van Rymsdyk,¹⁴⁰ who is known for illustrating William Hunter's¹⁴¹ gravid uterus research in the 1700s. In depicting the gravid uterus, Van Rymsdyk notably minimizes the body of the mother in the drawings. In his most famous of engravings for Hunter's *Anatomy of the Gravid Uterus* published in 1774, Van Rymsdyk depicts a disembodied abdomen and pelvic region containing an unborn fetus (Huffman, 1969; Thornton & Want, 1979). In downplaying the role of the woman in pregnancy, Van Rymsdyk is also downplaying the value of the woman in favor of the fetus and the act of the childbearing. This might signal that the role of the woman is solely for the work of childbearing in society, which reflects both social and cultural values of gender roles during that time in England and elsewhere. While one might make the case that the illustrator depicts only a portion of the body to focus on a specific region, I argue that the disembodiment of the mother from the womb is a reflection of gender values in Van Rymsdyk's work because proximity and proportion are important elements in educational anatomy and physiology texts. This is to say that in representing parts of the body, there is a

¹⁴⁰ Jan Van Rymsdyk (1730-1790) was a Dutch painter and engraver who worked often with William Hunter and William Smellie to create detailed medical illustrations (Huffman, 1969).

¹⁴¹ William Hunter (1718-1783) was an anatomist and teacher in Scotland known for his work in depicting the gravid uterus (University of Glasgow, 2016).

requirement to depict at least one representation of the organ *in situ*, or the organ in its original position as a part of the entirely intact body to demonstrate both proximity and proportion. In the case of an unborn fetus and uterine development, proximity and proportion are both vital aspects of teaching physicians how to identify health risks such as a contracted or prolapsed uterus, for example. There should be at least one image, then, which shows the uterus and fetus in situ. Because the pregnancies depicted in Hunter's text are all failed, the discourse permeating these failed attempts at childbearing suggests that a woman is literally nothing if she cannot give birth successfully, hence the use of only the disembodied abdomen in the illustrations.

Fausto-Sterling (2000) writes that "As we grow and develop, we literally, not just 'discursively' (that is through language and cultural practice), construct our bodies, incorporating experience into our very flesh" (p. 20). When it comes to anatomical representation, especially in medical technical communications, the way professionals and the public may learn to see not only themselves but others can certainly impact power structures in how various embodiments are treated both medically and socially.

Gray's Anatomy as the Most Enduring Modern and Contemporary Anatomy Textbook

A discussion of anatomy textbooks cannot be made without making mention of *Gray's Anatomy*, one of the most influential texts in contemporary medicine. Originally published in 1858, Henry Gray,¹⁴² a physician and anatomist, partnered with physician Henry Vandyke Carter¹⁴³ as illustrator to create a text that continues to be updated and published today. The publication of *Gray's Anatomy* in 1858 was an attempt to downplay the artistic and aesthetic elements and create a more "serious science" reputation for anatomy textbooks (Petherbridge &

¹⁴² Henry Gray (1827-1861) see Richardson (2009)

¹⁴³ Henry Vandyke Carter (1831-1897) was not listed as the illustrator on *Gray's Anatomy* until after his death. Gray did not want to give him credit, though Carter was the sole illustrator of the text (Hiatt & Hiatt, 1995; Richardson, 2009).

Jordanova, 1997, p. 96). Nonetheless, the book was designed as a new textbook for medical students that would make viewing the illustrations easier through the design and layout of the text, including labeling of figures. Most of the texts preceding *Gray's Anatomy* were “pocket sized,” hence illustrations were difficult to read for many students—necessitating a streamlined, larger edition (Richardson, 2009). Though elements of the artistic and aesthetic, such as backgrounds and elaborate poses, were removed to reframe anatomical illustration as “serious science,” *Gray's Anatomy* granted ever-stronger scientific ethos to the male body as the standard. In the original text, all of the illustrations were male forms, save for a single illustration of the female genital organs. As Laqueur (1990) notes upon describing in detail the male structures observed in researching *Gray's Anatomy* that “It is simply assumed that the human body is male. The female body is presented only to show how it differs from the male” (p. 167). This assumption through visual presentation of bodily structures becomes part of bodily discourse for those who access the book.

In addition to the presence of only the female genital organs in *Gray's Anatomy*¹⁴⁴, the written portions of the text also support the male body as standard in the use of parentheticals in descriptions of structures. Similarly to the notion of the uterus as a female scrotum or the vagina as an internal penis, the clitoris is described in parentheses as being “homologous to the penis” (Gray, 2012). The use of the parenthetical trope in *Gray's Anatomy* appears to comment once again upon the condition of female embodiment—the condition of being secondary in value to the standard male form, a deviation of that form only worthy of discussion in terms of the other. The naming of female reproductive structures in terms of male embodiment occurs elsewhere in the written text—and today, it still occurs in discussions of female castration and ejaculation, for

¹⁴⁴ For my purposes, the facsimile edition of 2012 was both accessible in my being able to acquire it easily as well as being clearly discernable. The text, consisting of more than 500 drawings, is 1280 pages and published by Fall River Press.

example. In terms of coital fluids, it is also interesting to note that male ejaculatory product is called “semen,” whereas female ejaculatory product is either nameless or referred to generally as “discharge.”

In 2005 and in its 39th edition, *Gray’s Anatomy* finally named Dr. Susan Standring as its first woman editor. During her time as editor, Standring has emphasized the need for improvements to the text to make it more accessible and more inclusive, calling upon the incorporation of images obtained through new technologies. In the preface to the 40th edition published in its 150th anniversary, Standring (2008) writes:

All of the pre 39th edition artworks, and the great majority of the images and micrographs of histological and embryological specimens have been replaced: wherever possible, the photomicrographs illustrate human histology and embryology, and non-human sources have been acknowledged in the captions. New artworks have either been generated de novo or have been taken from other texts (principally Sobotta's Atlas of Anatomy, Books 1 and 2 or Gray's Atlas of Anatomy), making this the first full-colour edition of *Gray's Anatomy*. (p. 5)

The 41st edition of *Gray’s Anatomy*, also edited by Standring, is a whopping 2,176 pages. In comparing the presentation of the female genital organs in the newest edition to the first edition, there is no homology between female and male structures—the clitoris is described as an autonomous structure, for example, with the use of parentheticals in the particular section made only to suggest certain complications in women or girls that may occur during developmental stages of growth. Female forms are also present throughout other portions of the newest edition, though at times when differences are noted between structures based on sex, the male structure is described first, followed by the female, though this could perhaps be an editorial choice in

consistency. Overall, the latest versions of *Gray's Anatomy* under Standring's influence as editor are much more illustrative of multiple embodiments, though there are still limitations in their approaches to creating more inclusive discourses of health and disease.

Medical Education and the Work of the Anatomist

Up until the publication of *Gray's Anatomy*, anatomical illustration as a skill for physicians and other medical professionals became less important in curricula, as more simplified and “practical” drawings were incorporated into lab instruction. Today, few medical education curricula include anatomical illustration as a skill for medical professionals. As a niche field, medical illustration emerged in 1911 at Johns Hopkins School of Medicine in the United States with the teachings of Max Brödel¹⁴⁵ who developed the first standards for medical illustration (Schultheiss & Jonas, 1999). There are two anatomical illustration associations available in the world: the Association of Medical Illustrators (AMI) in the United States, and the Institute of Medical Illustrators (IMI) in the United Kingdom.

Both the AMI and IMI set standards for medical illustrators—standards which, I argue could benefit from more emphasis on developing inclusive representations of health and disease. The connotation of the word “standards” implies the existence of values for an organization, including ethics. According to the AMI (2016) website, however:

Certification is a program endorsed by the AMI to encourage lifelong learning and to measure professional competency for those illustrators and clients who voluntarily desire such credentialing. Similar to specialty certification for physicians, the competency evaluation consists of a written test and a practicum. The Board of Certification of Medical Illustrators (BCMI) objectively measures and evaluates the examination results

¹⁴⁵ Max Brödel (1870-1941) was a German-born medical illustrator who immigrated to the United States known for his 19th century training in fine art focusing on precision and detail (Pace-Asciak & Gelfand, 2007).

and awards certification on successful completion. There is no relationship between certification and membership in the AMI.

This is to say that any medical illustrator in North America can join the AMI with a simple payment of dues. A practicum of ethics regarding the creation of inclusive representations is not necessarily incorporated into the AMI standards. The Board of Certification of Medical Illustrators (BCMI), which is endorsed by the AMI, does require that certain standards are met through examination for certification. These “standards” are set by the National Commission for Certifying Agencies (NCCA), which requires:

...to be an applicant for certification if (1) you have a degree from a recognized college/university program in medical illustration that includes a course in human gross anatomy with hands on dissection, proven by transcript; or (2) You have a minimum of five years full-time work experience as a medical illustrator substantiated by letters of reference from employers and proof of a college-level course in human gross anatomy with hands on dissection or its equivalent. (AMI, 2016)

As a deduction, then, medical illustrators, which the AMI (2016) makes a point on its website to note, may work and be successful without certification—without course curricula that includes any type of rhetorical training or instruction in ethics. Medical illustrators in North America, then, may or may not be trained through medical curricula at all. In one example of curricula for medical illustrators at Johns Hopkins’ School of Medicine, there is no course in ethics for students in the program. In its course titled “Scientific Communication,” which is one of the only courses not directly related to technique apart from a business course, there is also no ethics or rhetorical component. The course website states its goals:

- Orientation to the principles and practices of scientific investigation – with emphasis on the creative aspect of science.
- Review the elements of scientific investigation – experimentation, chance, hypothesis, imagination, intuition, reason, observation, difficulties, strategy, personal, scientists.
- Introduction to library skills and literature searching.
- Examination of critical thinking.
- Planning and organizing your time.
- Identifying the elements of good scientific writing.
- Understanding the steps in producing a paper for publication.
- Critical review of scientific papers. (Johns Hopkins School of Medicine, 2016)

The Johns Hopkins goals for “Scientific Communication,” and the program at large, then, could benefit from pragmatic feminist empiricist framework as part of its curriculum to foster inclusivity through rhetorical awareness. Overall, for medical illustrators as technical communicators working in North America, there is a wide breadth of skill-type and training that may or may not include being subject matter experts much less being expressly instructed in ethics or rhetorically trained to acknowledge and value differences. In addition, there is no training requirement to instruct medical illustrators on the importance of critically considering their roles in potentially perpetuating non-inclusive discourses—a training requirement I argue later in the chapter should be a requirement in all medical illustrator certification and educational programs.

The European IMI, in contrast to the North American AMI, is part of a curricular program of graduate and post-graduate study that sets its standards to directly inform inclusivity

through rhetorical and ethics training. In addition, medical illustrators cannot practice without licensure. According to IMI (2016). “The Fellowship of IMI is the advanced practitioner grade and is a prized distinction, demonstrating outstanding professional achievement,” and does so through degree award and through requiring registration with its affiliated National Register of Illustration Practitioners (NRIP). The NRIP lists medical illustrators with IMI licensure. In its mission statement, IMI (2016) notes that as “The leading body in Europe, it exists to promote the role of the medical illustrator as a professional member of a multi-skilled team who offer a range of core clinical illustrative and communication services as part of the healthcare team for the benefit of patients and clients.” In viewing curriculum requirements for medical illustrators in affiliated universities, such as Glasgow-Caledonian University (GCU) in Scotland, it appears there is an emphasis on ethics and critical inquiry as well as inclusivity:

The Biomedical Science Programmes aim to:

- (i) provide an understanding of the scientific investigation of human health and disease;
- (ii) produce graduates who have developed the skills, knowledge and competence to practice in Biomedical Science;
- (iii) develop laboratory skills to allow students to make valid scientific measurements;
- (iv) produce graduates who are able to integrate theory and practice and who are critical, reflective thinkers;
- (v) foster an ethos of career-long, self-directed learning through continuous professional development;
- (vi) provide students with a supportive learning environment;
- (vii) be inclusive of all sectors of society and be responsive to the needs of individuals, employers and stakeholders. (GCU, 2015)

The final aim of the GCU program requirements, taken from undergraduate programming in medical illustration, appears to mesh with pragmatic feminist empiricism in its goal to train its students to be rhetorically-aware technical communicators.

For the purpose of my analysis, then, I will focus on ethics for technical communicators through pragmatic feminist empiricism, applying the methodology to a selection of anatomy texts published in North America. Upon analyzing the inclusivity of sexed embodiments in the texts, I will then offer ways that curricula and organizations such as the AMI and BCMI can improve technical communication through pragmatic feminist empiricism and the integration of technological training as part of its instructional and certification procedures, which are derived from medical education curricula.

Analysis of Popular Texts: *Netter's Atlas of Human Anatomy*, *Grant's Atlas of Anatomy*, and NLM's *Wall Charts*

According to a 2008 study by Maria Jose Barral Moràn, a psychology professor at the University of Zaragoza, there is evidence that North American anatomy texts present the white male body more often as a standard form than female bodies and bodies of non-white races. In her study, six North American texts were analyzed to determine which types of embodiments are more prevalent. While Barral Moràn's research shows that the white male body seems to be operating as a universal model for embodying health and normal anatomy, she does not point out reasons for this phenomenon other than the centric epistemologies that inform medical discourse, nor does she offer a solution to improve models other than to include more embodiments (Barral Moràn, 2010; Plataforma, 2008). Barral Moràn makes great contributions to the field of psychology in studying how cultural behaviors impact sex differentiation in scientific disciplines; however, there is room to expand this type of research into technical communication

to investigate the role of embodiment, value, and the recursive nature of the elements that create, reflect, and transform discourses of health and medicine. My work extends Barral Moràn's work in that it uses the notion of embodiments which occur through physical and experiential identities to locate how medical technical communications are formed. In addition, I develop pragmatic feminist empiricism as a tool for technical communicators to acknowledge embodiment in order to find value in differences. To continue to support the idea that more inclusive representations are necessary for the expansion of definitions of health and disease, I will show through an analysis of popular medical texts that pragmatic feminist empiricism is beneficial for technical communicators in critiquing and developing medical models.

Similar to the approach I took in providing a case study of the Visible Human Female (VHF) in Chapter III, the analysis of popular texts will include a brief overview of the text's origins, an analysis of sexed images¹⁴⁶ in the text, implications of how sexed images create discourse in the text, and a discussion of how pragmatic feminist empiricism operates within the text and may be applied to expand and revise the text to offer more inclusive definitions of health and disease. I have selected two popular anatomical textbooks commonly used in medical education curricula published in North America: *Netter's Atlas of Human Anatomy* and *Grant's Atlas of Anatomy*. In addition, and to investigate the occurrence of prevailing discourses in texts written for public audiences, I also analyze *Wall Charts of Human Anatomy: 3D Full-Body Images and Detailed System Charts*, published by the National Library of Medicine and using imaging from the Visible Human Project.

¹⁴⁶ While race is a factor in how diseases may manifest and respond to treatment, I am intentionally only focusing on sex in order to leave room for new research and new applications of pragmatic feminist empiricist framework for future work.

Methods, Parameters, and Rationale

In order to draw parameters for what I was searching for in the analysis, I first decided that I must work from my position as a scholar of technical communication and rhetoric. I am no subject matter expert in anatomy; however, I, like much of the lay audience and novice medical students, am able to differentiate between binary sex phenotypes of commonly represented XX and XY traits to determine the occurrence of the binary sexes of stereotypical “female” and “male” embodiments. These traits I identify through the presence of genital structures. Through preliminary analysis of the images in the texts, there are representations that appear to fit gender stereotypes such as garment styles¹⁴⁷; however, I do not mark these images as “sexed” because garment styles are a construct of gender instead of a mark of biological sex.

I realize there are many limitations in the type of observation I undertake, but because medical discourse is a reflection of institutional, social, and cultural values that involve the public, this research is valuable. As a layperson and member of the public, I acknowledge my inability to identify certain internal structures through binary labeling as “female” or “male,” such as having the skills to identify a “female” heart versus a “male” heart, for example. I again justify limiting the analysis to images that contain an indicator of sex differentiation through the presence of genital structures. In addition, I only analyze the occurrence of binary sexed images¹⁴⁸ in representations that are unrelated to reproductive systems, which are in every text disambiguated to illustrate “female” and “male” systems. I then discuss the findings and apply

¹⁴⁷ The plate entitled “Inspection of the Larynx” in Netter’s *Atlas of Human Anatomy* is a great example, where a physician is examining a patient wearing what appears to be a business suit—it is unfair to assume that the patient is one sex or another, as garments-as-sexed are a product of how gender is constructed and not indicative of biological sex (Netter, 2014, p. 189).

¹⁴⁸ I use the term “sexed images” to refer to images that bear genital structures that appear to conform to binary sex phenotypes of “female” and “male.” “Genital structures” refers to the presence of ovaries or testes—external structures such as female breasts are not included as sex phenotype is not conclusive upon visual examination of a breast without the identification of ductal trees (Sternlicht, 2006).

pragmatic feminist empiricism to the findings to show how the representations create, reflect, or transform prevailing discourses of health and disease. I apply the methodological framework to each text, offering suggestions for revision where there are needs.

Netter's Atlas of Human Anatomy

At a young age and growing up in the early 1900s, Frank H. Netter wanted to be an artist. Upon the wishes of his family, however, Netter attended medical school to become a surgeon. In fusing his interest in art and his work in medicine to make money following the Great Depression, Netter used his artistic skills and medical understanding to sell illustrations to pharmaceutical companies. Medical illustration became so lucrative for Netter that he quit his practice altogether in favor of a career illustrating. He produced over 4,000 illustrations that become the basis for the Atlas of Human Anatomy, originally published in 1989 by Elsevier.

Netter's Atlas of Human Anatomy is currently in its 6th edition and is commonly used in medical education settings. For the purpose of my analysis, I have used the 2014 6th edition in its digital format. In the 6th edition, Netter's original paintings, reproduced through scanning and filtering the original works, appear with additional explanatory diagrams just as they do in the original 1989 edition, which has seen relatively few formatting updates. One update to the images in the text is the addition of images depicting internal structures that can only be accessed through medical imaging technology. In order to adhere to Netter's style of painting, Elsevier hired Dr. Carlos Machado,¹⁴⁹ a cardiology surgeon and self-taught artist, to illustrate additional plates. The 6th edition is 640 pages and contains 532 color plates depicting anatomical structures.

Of the 532 plates in *Netter's Atlas of Human Anatomy*, I identified 15 that were sexed which were not part of reproductive structure representation. Of the 15 images, 13 were sexed as "male" while only 2 were sexed as "female." This is to say that 87% of the sexed images in the

¹⁴⁹ Carlos A. G. Machado, born in Brazil, is a medical illustrator specializing in photorealism (Elsevier, 2016).

text were “male,” which supports the idea that the androcentric model of embodiment which has informed medical discourse is still enacted through medical models as visual technical communication. Male sexed images included systems such as the autonomic nervous system, abdominal walls, and major organs such as the liver and kidneys; female sexed images were only present in lymph vessels and nodes and abdominal viscera.

For Netter and Machado, who produced the images for the text, their own embodiments might have influenced the prevalence of male sexed images. Social and cultural influences have the potential to impact one’s vision of “normal,” “healthy,” and “standard.” In addition, Netter and Machado embody professional ethos in order to demonstrate the values of the institution in their work through content and publication standards. Their work in representing diverse embodiments (i.e. female or other non-binary representations) is limited, thereby reflecting prevailing discourses of the male body as standard.

One interesting observation of the text is the lack of parenthetical tropes to describe female structures in terms of male anatomy. The clitoris, for example, is not referred to as a “truncated penis” or some other deviation of the male sex organ. *Netter’s Atlas of Human Anatomy* does take an ethical approach to the representation of the clitoris, like the updated edition of *Gray’s Anatomy*, in presenting the structure as its own entity, unique to binary female embodiments. However, from a design standpoint, the layout of the reproductive systems lists the male system first, followed by the female system. In addition, when specific structures are listed on the same page, the male structures are placed on the left while the female structures are placed on the right, which is based on the Western pattern of reading from left to right. Because the text is intended for Western readers who read left to right, this indicates privileging the male embodiment as the origin point of understanding anatomy.

As a viewer, I noticed that while I could not label all of the images in the text as “female” or “male,” often my own ideas of gender constructs based on garment styles, hair styles, and other cultural markers of gender influenced my own relationship to the text. In my own mind, I labeled images as “female” or “male,” though I could not include these associations in the data. I felt as a consumer of the images that I overall could not relate to them, as in my embodiments such as my sex, gender, and general appearance were not reflected in any of the drawings in the book. I did note that every representation which showed skin in the text was white, however; though I am white, my rhetorical training and use of pragmatic feminist empiricism allows me to acknowledge this observation and call it into question. What do images of primarily males who are white tell us about health and disease in medicine? How do we aspire to be what we are not? From 1989 to 2014, the text has not been updated to demonstrate diverse ethnic and gender embodiments to paint a clearer picture of health and disease even though Machado, a new artist, was hired to create more images for the text.

As for the editorial board for the text, the credentials and embodiments of the individuals who comprise that unit seem diverse, including a number of individuals holding MD degrees in various bodily systems and PhDs focusing on research and editing practices in scientific communications. They are all, however, bound by institutional as well as social and cultural values. I would argue that if they are bound by these values, they may also be unbound by them—through acknowledgement of themselves, of others, and the impacts of their findings for future discourses through pragmatic feminist empiricism—so that they might reimagine how to present some of the images in the text in a new edition to reflect a more accurate representation of the individuals who they intend to serve by the publication.

This reimagining of texts might include the creation of more dynamic modeling,¹⁵⁰ for example, where digital formats might allow the user to select attributes of embodiment such as sex to view organs and organ systems and access differences. Data from the VHP once it is expanded, for example, may be used in this way to offer various iterations of organ and body systems that may be called up into an interface at the click of a mouse. To use pragmatic feminist empiricism in this type of dynamic modeling in a digital text, one might choose to view a model based on their own embodiments of sex, then click through with new criteria that differ from their own in order to view changes of organs in situ and learn from these differences. As for future uses of this type of dynamic modeling, the notion of the existence and value of multiple embodiments is embedded in the design of the text. In accessing digitized dynamic models throughout a textbook, the user is encouraged to exercise pragmatic feminist empiricism through an acknowledgement of differences perpetuated by the text itself through a presentation of options in viewing organs and organ systems in various iterations. For Barral Moràn, the identity of the technical communicator shapes the technical communication and there should be more embodiments included in texts. With pragmatic feminist empiricism, especially when it is incorporated into the design of a text, technical communicators can both evaluate and critique technical communications they encounter and use the framework to challenge the way models are presented through textual design to create discourse.

Grant's Atlas of Anatomy

John C. Boileau Grant was an anatomist working in Canada and the United States. Having been formally trained as an anatomist in the United Kingdom, Grant worked under the

¹⁵⁰ I use the phrase “dynamic modeling” in the sense of the model’s ability to be manipulated by the user. As opposed to “static” or fixed models, I propose that with digital technologies, models can be changed based on input criteria to show differences.

tutelage of famed anatomist Daniel John Cunningham.¹⁵¹ Upon serving in the military during World War I and working briefly as an anatomy professor upon discharge, Grant moved to Canada to take a post at the University of Toronto. It was during his tenure at the University of Toronto that Grant would begin publishing his works on anatomy and dissection, including a book on dissection, *Grant's Dissectors*, and his *Atlas of Anatomy*.

Grant's Atlas of Anatomy, originally published in 1943, is currently in its 14th edition. Due to availability and justified by the fact that there are relatively few revisions from the 13th to the 14th editions save for the addition of CT and MRI images, I am using the 13th edition in digital form for the analysis. The text is 888 pages long and contains 1600 images. Apart from many of the original 1943 images drawn by Grant, the 13th and 14th editions also include photography of surface anatomies in order to provide more contexts for the placement of internal structures (Lippincott, Williams, & Wilkins, 2016). Published by Lippincott, Williams, and Wilkins in 2012, the text is edited by Anne Agur, a Professor at the University of Toronto, and Arthur Dalley, a Professor at Vanderbilt University School of Medicine and adjunct professor at Belmont University School of Physical Therapy.

Out of 1600 images in *Grant's Atlas of Anatomy*, including both drawings and photographs as representations, I identified 65 as sexed. Of the 65 sexed images, 48 were “male” and 17 were “female.” This means that 74% of the images in the text are “male” based on the binary criteria I set forth in my rationale of the analysis. Like my findings in *Netter's Atlas of Human Anatomy*, *Grant's Atlas of Anatomy* seems to also conform to an androcentric model as the origin point for defining health and disease. Male sexed images represented systems such as organs of the circulatory system including the heart, overall autonomic innervation (nervous

¹⁵¹ Daniel John Cunningham (1850-1909) was a physician and anatomist in Scotland (Kaufman, 2008).

system), and both anterior and posterior surface anatomies; female sexed images represented structures such as the upper limbs, craniofacial muscles, and cranial nerves.

Agur and Dalley, as professors at highly respected specialty institutes of medicine, are, like Netter and Machado, influenced by values and prevailing discourses in the field. Their own relationships to their research and embodied experiences of social and cultural values might also compete with their choices in editing the text. As a highly respected and influential text, *Grant's Atlas of Anatomy* as an institution itself might also influence the text. This is to say that in order to preserve the ethos of the original author, Grant, and to continue his legacy, the editors might be limited in how much they can challenge the discourses put forth in the text. The use of ethos in preserving “legacy” in publishing is worth challenging, in that the values of legacy which may tend to marginalize certain embodiments may be preserved and allowed to continue shaping discourses. I would argue that challenging these legacies to expand and to grow to represent more diverse embodiments to create more inclusive definitions of health and disease would ultimately do more to honor legacies and to strengthen ethos.

In studying the presentation of specific systems such as the reproductive systems, I noticed once again that the male structures were placed to the left of female structures when they appeared on the same page. In addition, male structures also appeared first in the text, with female structures following. The use of the parenthetical trope to describe female structures in terms of the male structures presented before were, however, used frequently to describe certain organs specific to the female reproductive system. Structures surrounding the clitoris were described in a parenthetical as such: “Homologous of the bulb in the penis, the bulbs of the vestibule exist as two masses of elongated erectile tissue that lie along the sides of the vaginal orifice; veins connect the bulbs of the vestibule to the glans of the clitoris” (p. 276). This

description privileges the male structures as the standard, framing the female structures as some sort of deviation from the male, which is untrue, as all embryos start out the same until hormones are released to determine the path to sexual development (Fausto-Sterling, 1985). The text also uses the parenthetical trope once again to describe the “Female Pelvic Organs in Situ”: “The uterus is usually asymmetrically placed. The round ligament of the female takes the same sub peritoneal course as the ductus deferens of the male” (p. 237). Once again, to communicate that the female structure “takes the same...course...of the male” is to imply that the male embodiment is the standard from which all other embodiments deviate.

As a researcher counting and observing, it became clear that there was still an abundance of male embodiments represented in the text, with few representations to which I could personally relate through my own embodiment of biological sex. In the images that were sexed as “female,” I felt myself beginning to lay cultural values of standards of beauty onto the representations, particularly those concerning the craniofacial and cranial regions. With the attention on structures in the face, I could not help but wonder if the model in the photographs was chosen because a face should fit society’s standards of beauty. Similar to my analysis of weight and ideals of appearance in the *Visible Human Female* in Chapter III, this notion of choosing one particular embodiment (that of a young, smooth-faced female) to depict “normal” or “standard” craniofacial structures may communicate the prevalence of values in aesthetic beauty as equating to health or normality.

The discussion of reproductive structures through the use of parentheticals challenged me as a researcher embodying the biological sex traits of the female representation. I could actually feel through my rhetorical awareness that my differences from the male representation were not valued as unique, but as a product or deviation of the male standard as norm. In addition,

although my analysis focuses on sexed images and not race, in embodying pragmatic feminist empiricism I also once again noticed that the primary race depicted in the text was, like me, white, though there were several representations of non-white ethnicities in this particular text. Still, I can acknowledge that difference is highly undervalued through the emphasis of the white, male-sexed images in number, placement, and as origin points for other structural descriptions.

Grant's Atlas of Anatomy is, in comparison to *Netter's Atlas of Human Anatomy*, an older text that may contain more remnants of the institutional, social, and cultural values of its time; however, with editors currently working at respected institutions and with advanced degrees, it is possible that institutional values have simply endured and are thereby continually reflected through the discourse created by the visual technical communications in the text's medical models and parenthetical descriptions. While I do not aim to suggest that the contents of the texts are not valuable, I do believe there is room to expand and diversify in order to represent more embodiments and expand definitions of health and disease through visual technical communications. By acknowledging ourselves, valuing differences in embodiments, and questioning how inquiry can shape future discourses through pragmatic feminist empiricism, we can improve health for all embodiments.

Wall Chart of Human Anatomy: 3D Full-Body Images and Detailed System Charts

Published by Fall River Press, *Wall Chart* was published in 2001. The text is edited by Thomas McCracken¹⁵² and Martin Griffiths¹⁵³ and is produced with, according to its cover, "3D anatomy based on the National Library of Medicine's Visible Human Project." I first encountered the text as I was perusing a massive book retailer on a casual weeknight shopping

¹⁵² Thomas McCracken is a Course Director and Professor of gross anatomy at the University of Medicine and Health Sciences in New York (UMHS, 2016).

¹⁵³ Martin Griffiths is a UK-based artist working primarily in comics illustration, particularly the Marvel UK's franchise *ThunderCats* (Thundercats, 2007).

trip. The image on the cover caught my eye, though I did not initially notice the small caption on the cover that indicated the VHP as the source for images in the text. It was the image of the body on the cover, the muscle tissues of the visible human male that caused me to stop and take a look. I had already been researching the VHP, so the image was familiar enough to me that I actually recognized it outside of my primary research materials.

Measuring at 12.10 x 17.40 x 0.50 inches, the 26-panel wall chart is organized by six major body systems: the nervous system, lymphatic system, endocrine system, respiratory system, reproductive systems, and kidney and urinary system. The chart also features both skeletal and muscle tissue representations. The chart is meant for a general review of anatomy for the public—major organ systems, bones, and muscles are labeled without detailed descriptions of their function or common diseases related to their function. Images are full-color and meant for display, folding out of the book with perforations for their removal. There is only one edition: no updates since 2001 have been made to the original text.

Out of 26 panels featuring images of anatomy, only 4 non-reproductive images were sexed: 3 “male” and 1 “female.” Because I am familiar with the form of the Visible Human Male, however, I can say that the other images that did not show genital structures still belonged to that data set. I felt it was unfair to include them since this information is unclear to the lay reader, the intended audience. In keeping with my criteria for analysis, then, the number of sexed images as a ratio of “male” to “female” comes out to 75% male images. This is a small data set and I cannot justify its use to make broad claims; however, the information in the analysis does seem to support my observations in Chapter III regarding the use of the VHP male dataset as a representation of standard, normal embodiments of health.

As I discuss in Chapter III, the VHP male data set was completed in 1994 with the completion of the female dataset in 1995. This means that by 2001—even well before then—information for both datasets was available for use. In fact, the Visible Human Female, as I also point out in the previous chapter, was imaged at higher resolutions than the male dataset, producing even clearer images of anatomical structures. Nonetheless, from cover to end, only information from the male dataset is featured in the chart, and the majority of the images are sexed as male. I also could not help but notice as a result of both my scholarly and female embodiments that in the reproductive system images, a computer-generated representation of the female pelvis in a small box appears in the section “The Endocrine System” and a computer-generated female body is used to represent “The Female Reproductive System.” For some reason, the editors chose not to use the Visible Human Female dataset, yet their claim on the front of the text claims that the images are derived from the VHP. For me, this omission of the Visible Human Female dataset communicates that high quality imaging as opposed to computer-generated representations prioritizes the male form—that computer-generated images from an artist’s hand as opposed to actual data are satisfactory in communicating the female form.

There is no justifiable explanation, then, for the lack of high-quality, human images from the Visible Human Female dataset other than the possible impact of social and cultural values on the publication. In Chapter III, I show that the Visible Human Female was critiqued by the public for the donor’s age and size—there is a chance that those factors, which reflect social and cultural standards and values of health and beauty, may have influenced the choice of the editors to generate an image to represent female reproductive embodiment rather than use information from the female dataset. The editors had a choice in how they represented the public in the text, and their choice was to prioritize the male form through the use of high-quality, human images

from the Visible Human Male dataset and omit actual female human data in favor of artistic representation.

As I mentioned before, I was drawn to the *Wall Chart* in a bookstore because I recognized the representation on the cover. I also already knew that the VHP consisted of both male and female datasets. The lay audience may not be familiar with the VHP, and from the description of the project in the preface of the book, readers may still be unclear about the number and characteristics of representations available. This might communicate to readers that there is a preference for the male form in that only high-quality, human images in the text are used to represent male embodiments. It might also perpetuate the idea that the male embodiment is standard, where the female embodiment is a deviation only in certain structures such as the reproductive systems. This, as I have shown, is problematic especially in granting the public access to their own embodiments and continues to privilege the male form. Already, I knew that the embodiments represented in the text would not be inclusive in many ways because they were derived from the VHP, which has not expanded yet to include a diverse array of embodiments. Even still, I approached the analysis with an open mind and with the criteria of identifying the use of sexed images as the guide.

As in *Netter's Atlas of Human Anatomy* and *Grant's Atlas of Anatomy*, I once again did not see myself in the text. I saw continuous images from the Visible Human Male dataset—even though I did not “count” them in my grouping of sexed images for non-reproductive structures when I could not see the genital structures. Upon seeing so many uses of the male dataset, the change in style of representation, which was clearly a computer image or digital drawing of a female silhouette, I again clearly could see that there was a privilege related to embodiment. As

in the other texts in my analysis, the male images always preceded the female images, and on a page side-by-side, the male appeared on the left and the female on the right.

With regard to the use of the parenthetical trope, the *Wall Chart* made exceptional use of it to homologize female structures to male structures in the reproductive system. According to the text regarding the clitoris, for example, “The clitoris is homologous with the penis and although its glans and shaft are much smaller, its internal anatomy is extensive.” Again, the penis is presumed to have come first and is privileged as the origin point from which female structures must have developed. The homologizing of the clitoris to the penis once again echoes Laqueur’s one-sex model, where the male sex structures are the standard from which female sex structures deviated or were inverted.

In representing embodiments to privilege male embodiments as standards, such as the *Visible Human Male*, texts like the *Wall Chart* are impacting public discourses of health and disease through the publication of easily accessible, popular texts. Barral Moràn (2010) argues in her research that identity constructs scientific representations; I argue that the inverse is also possible. Texts like the *Wall Chart* continue to place the male body at the center of medical epistemologies of medicine, reflecting and reaffirming prevailing discourses that hinder definitions of health and disease from expanding to include diverse embodiments. The study and representation of diverse embodiments can certainly help both the professional and the lay person learn more about how there is value in difference in how we learn and understand—how we come to know ourselves.

Moving Forward in Designing and Valuing Differences

My findings in analyzing popular textbook representations of anatomies showed that they still identify male bodies as the standard for defining health, disease, and other clinical practices.

Visual technical communications, while providing opportunities to create and transform new discourses that are more inclusive of diverse embodiments, do not always embrace these opportunities. In acknowledging the embodiments of the institutional, social, and cultural that are at work in forming the identity of the technical communicator, recognizing the value in difference in those embodiments represented and served by technical communications, and considering the multiple aims inquiry may show through pragmatic feminist empiricism, technical communicators can begin to challenge discourses that limit the way the field defines health and disease.

To create more inclusive representations for the texts I analyze, I would first note that for each text, the technical communicators who are in charge have acknowledged their own professional embodiments through the use of source materials such as Netter's and Grant's original images, as well as images from the VHP. The original images, though they privilege a single type of embodiment, are still useful and should not be discounted. Those representations that favor a version of male embodiment are ethical in that they both represent and benefit *part* of the public who is served by the technical communication. In practicing the pragmatic feminist empiricist principle of valuing differences in the diverse embodiments of those who are represented by and served by the technical communication, however, the technical communications at each publication could improve. There are a number of embodiments that encompass the public served by the technical communications; for the purpose of my research, I only looked at binary sex differentiation which, if considered and valued, would do a great deal to expand discourses in medicine and help to locate more values in difference to empower more people. Technical communicators must consider what their visual technical communications suggest about power in the field and power in societies and cultures, with the goals of improving

health care and advancing knowledge about how to define health/illness and approach care. There is no need to move away from representing male sexed images in anatomical texts, for example: there is a need to represent female and intersexed images as well to show differences so that people may learn from them, which may be accomplished through pragmatic feminist empiricism. Barral Moràn (2010) also argues for the inclusion of more embodiments to create more inclusive discourses, positing that the technical communicators' identities shape scientific representations and their identities should be neutralized; however, I argue as I have in previous chapters that neutrality and objectivity is impossible and that there is value in acknowledging the embodiments and experiences of the technical communicator to create more inclusive definitions of health and medicine. Barral Moràn's work demonstrates exigency, which I also find in my research, but I extend this work in offering pragmatic feminist empiricism as a way to value multiple perspectives of both the technical communicator and those who are represented by the technical communication.

Through the use of pragmatic feminist empiricism, the technical communicator also has the ability to transform discourses to create more inclusive definitions of health and disease. In representing anatomies, the design of the visual technical communication plays a vital role in perpetuating prevailing discourses of empowerment for certain embodiments—discourses of empowerment subsequently can disempower. With technology, the visual technical communicator has the power to offer options for the user to access differences in embodiments that may foster the notion that values are many in the study of anatomy and physiology. Imaging techniques and the expansion of knowledge to create more inclusive discourse is a matter of offering access to the viewer, which I suggest through the use of dynamic modeling as one example of challenging traditional medical illustration to shape anatomy and identity. Sawday

(1995) identifies the connection between anatomy and identity, positing that identities are formed through using the mind to map the body. The influence of the mind over the body and the body over the mind, I would also add, shape identity. As Breton notes, the individual may gain autonomy in understanding themselves in relation to others through anatomical knowledge (Cuir, 2009). What we learn by experience through our bodies and about our bodies through our minds shape who we are and how we view others. Visual technical communications are part of that system, and when those such as traditional, static medical models fail to provide inclusive definitions of health and disease and present a version of a singular, standard embodiment, we limit the expanse of our own knowledge about ourselves and others.

Future of Medical Education and Transformation of Discourse

In studying the presence of sexed images in representations of anatomies in popular textbooks, I have shown that there are benefits which may result from the application of pragmatic feminist empiricism to the expansion of those texts. Anatomy textbooks are important as part of medical education, and if visual technical communicators producing those texts can find ways to challenge the androcentric model upon which the field has relied for so long, then transformative discourses may result which help individuals, institutions, societies, and cultures to learn. Pragmatic feminist empiricism allows the technical communicator to move beyond themselves without minimizing their own value in acknowledging the value of differences in others. To challenge the androcentric model, I propose that technical communicators think rhetorically and use technology to their advantage. Gone are the days when a single image can be accessed on a page of a book—there are possibilities that allow the user to interact with the text to view multiple images based on criteria.

The textbooks I analyzed, then, do not necessarily need to get longer—some of the images, such as the representation of the abdominal wall in *Netter's Atlas of Human Anatomy*, for example, could be redesigned in static texts to depict a female embodiment of those structures, and in their digitized versions the various embodiments could be represented through dynamic modeling. In the case of *Grant's Atlas of Anatomy* and the *Wall Chart*, removing parenthetical tropes that homologize female and male structures would resituate those embodiments to reflect more of a balance and debunk the myth of female embodiments as deviations from a male standard, in addition to incorporating images from the Visible Human Female dataset to show that high-quality, human images are not only reserved for the depiction of the male form. Even though I did not analyze race in the texts, I would also argue that based on my unmeasured evaluation through the use of pragmatic feminist empiricism, including more diverse racial representations of embodiments would also help to transform discourses that privilege white embodiments and present them as if they are standards for forming definitions of health and disease. I hope that race scholars can take up this notion as an expansion of my research that incorporates pragmatic feminist empiricism. As I point out in previous chapters, both sex and race are factors that influence the manifestation and treatment of certain diseases, in addition to risks associated with the development of some diseases. Through feminist inquiry, one can identify the origins of medical and health discourses and understand how values shape them and allow them to continue when they oftentimes disempower certain embodiments based on a number of factors.

For medical education, both formal and informal, technical communication is the vehicle through which discourses are created, reflected, and transformed. I urge certifying organizations such as the AMI and BCMI to begin developing criteria for educating members on rhetorical

listening and ethics of inclusivity. If medical illustrators are not taught to think rhetorically, inclusivity may not be part of their awareness when they are designing medical technical communications. In addition, programs of study should also incorporate rhetorical training in ethics of inclusivity—demonstrating the power of discourse on public health and access. To overcome limitations in access, programs should also educate medical illustrators on the uses of technology to create more inclusive definitions of health and disease, such as through the use of digital formats to develop dynamic models when representing embodiments. In developing models that are dynamic through digital texts, visual technical communicators have a unique opportunity to work through and allow their work to embody pragmatic feminist empiricism in acknowledging through multiple criteria that there are differences between embodiments in existence which users may access.

Whether anatomy texts are developed for aspiring professionals or for the lay audience, their design can influence identity of the consumer in such a way that impacts the way they view the world and interact with others. The terministic screens through which we learn to view the world are the products of discourses shaped by institutional, social, and cultural factors. As I mention in Chapter II, medical discourses are living discourses—discourses that grow and change just as bodies grow and change in various stages of development and in response to environmental and technological factors. They are dynamic. Our medical models should be dynamic as well. Change is often hard to make, but technical communicators have the power through pragmatic feminist empiricism and through technology to take steps and justify taking those steps in order to transform discourses to make them more inclusive of those whom they are meant to represent.

CHAPTER FIVE

Pragmatic Feminist Empiricism as a Pedagogical Tool for Teaching Technical Communication

In the first two chapters of the dissertation, I justified the need for rhetorical intervention in medical technical communication and offered pragmatic feminist empiricism as a tool for technical communicators to address inequities in primarily visual technical communication. I applied pragmatic feminist empiricism in Chapters III and IV to case studies involving medical models and the discourses they create, critiquing the National Library of Medicine's Visible Human Project® (VHP) and representations of human anatomy in popular textbooks, respectively. I have identified in these chapters the importance of pragmatic feminist empiricism as a tool for potentially changing discourses of health and disease to be more inclusive, showing how technical communicators can critique current models to expand definitions and implement inclusivity in designing new models.

Industry professionals working in medical and clinical fields are not the only technical communicators who can benefit from pragmatic feminist empiricism as a rhetorical tool for design. This final chapter will demonstrate how pragmatic feminist empiricism can be applied in the scientific writing classroom as a pedagogical tool for both instructors and students as they learn to critique and design their own communications. The scientific writing classroom is a critical space for budding medical technical communicators—pre-med students, nursing majors, and other students in biomedical sciences rely on scientific writing instruction to shape their composing processes in preparation for communications in their future careers. For instructors, applying pragmatic feminist empiricism to instructional design¹⁵⁴ of lectures, assignments, and

¹⁵⁴ The term *instructional design* is synonymous to *course design* in many ways, but I prefer this phrasing as it connotes not only the design of a course on paper, but the approaches that are taken in executing the actual

the classroom environment fosters sharing and cultivates the recognition of value in difference as it pertains to achieving new knowledge. For students, pragmatic feminist empiricism encourages the critique of prevailing discourses that tend to marginalize certain embodiments and the creation of new discourses to expand definitions to include more perspectives. For students who are undergoing the rigors of creating a professional identity for themselves as they move toward becoming experts in their disciplines, pragmatic feminist empiricism equips them for transferring critical inquiry from the classroom into the professional realm.

In this chapter, I will share my own process in implementing pragmatic feminist empiricism as I develop both face-to-face and online versions and course materials for a scientific writing class at East Carolina University. To denote reflection and embodiment of pragmatic feminist empiricism in that process, passages will appear with the infinity sign (∞) and be written in italics, as I have done in Chapter II. I chose to collect data in *Scientific Writing*, an advanced writing course composed primarily of biological sciences and pre-med students, to show how pragmatic feminist empiricism as a tool for medical technical communicators can challenge the discourses currently held by professionals in the field as well as the public about how health and disease are defined. A study in this type of course complements the work of previous chapters by identifying how discourses may be transformed to become more inclusive at the source of their distribution. In shaping the course in both face-to-face and online iterations with pragmatic feminist empiricism and teaching pragmatic feminist empiricism as a rhetorical tool to improve communications, I support students in learning a skill that translates to their future careers in medical professions.

instruction within the course through rhetorical listening and the shifting and shaping of materials while the course is in progress.

Classrooms as Communities of Practice and the Transfer of Prevailing Discourses

The university is largely a place where professionals who are learning through enculturation begin to take up prevailing discourses in their respective fields without question in an effort to achieve educational and career goals. The classroom, then, is the heart of the institution with curricula, assessment guidelines, and other factors that influence instructional design. Lave and Wenger's (1991) community of practice (CoP) model, which I discuss in Chapters I and II, serves as a lens through which we can observe the transfer of discourses to aid in the formation of a professional identity through enculturation¹⁵⁵ and formation of domain knowledge, or knowledge emerging from interaction and sharing of perspectives. In professional spaces, "the community of practice emerges from a desire to increase domain in order to accomplish the task. The community of practice, therefore, is not created or established, but is a product of the desire to complete a task and domain knowledge in a group" (Baker, 2014, p. 32). This phenomenon works the same in classroom environments as they, like professional spaces, are goal-oriented. Course goals are expressed via institutional criteria for curriculum design and University mission, language requirements are founded on prior knowledge and learned specialized knowledge gleaned from course content, technologies used in the classroom shape compositions, and values reside in the assessment criteria for the course that is shared at the beginning of the course on the syllabus or via rubrics for individual assignments.

The CoP, then, cultivates a space in which inquiry may be fostered to improve communications—a place for practicing pragmatic feminist empiricism to engage in inquiry. Pragmatic feminist empiricism provides a way to question discourses—including elements of language, value, and technology that inform the CoP in the first place. Certain institutional

¹⁵⁵ "Enculturation" encompasses not only the acquisition of skill sets for communication, but the learning and practice of other cultural and social contexts within which communication is executed (Miller, 1979).

discourses¹⁵⁶ inevitably influence the type of domain that is formed from collaboration of professionals working through similar lenses that are required of them. Pragmatic feminist empiricism calls these discourses into question. Centric epistemologies that are based in a major discipline are often taught as canonical truths from whence disciplinary and professional conventions, such as genres and modes of composing, originate. If critical inquiry is not encouraged through engagement with a variety of texts and multiple perspectives in any discipline, circular reasoning may give way to the reflection of discourses that only offer a single perspective, which may limit domain knowledge.

I have realized that as an instructor I have the power to shape the transfer of discourses through the way I enact the CoP model—pragmatic feminist empiricism has shown me this. Instructors are technical communicators working in and across disciplines to share and shape discourse through the introduction of specialized languages to enculturate their students into respective disciplines. As technical communicators in the scientific writing classroom, for example, instructors educate students in the use of specialized research in biomedical and other scientific fields toward the creation of projects for fulfilments of requirements of the course—to the end that students grow enculturated into scientific disciplines and can learn to practice skills and communications in their future careers. The first step into carving a professional identity for any individual begins in the classroom, where disciplinary expectations and conventions are taught and assessed. “Success” is measured by how enculturated one becomes in learning toward joining a professional CoP—I make this clear to my scientific writing students. This is why the classroom may be the most critical space for encouraging inquiry. Inquiry is essential to

¹⁵⁶ By “institutional discourses,” I am referring in general to any administrative governing body that regulates and requires specific professional conventions, including university, field-based professional, and governmental institutions.

acknowledge the value in differences and the impacts of communication design on health and medical discourses.

While the CoP model does work as far as cultivating a space for collaboration in the scientific writing classroom, I have identified the need for pragmatic feminist empiricism in helping to foster the growth of truly new domain knowledge to give students as medical technical communicators the tools to challenge and transform prevailing discourses that disempower. If my students and I are practicing the use of a common language, technology, and values to achieve course goals in our scientific writing classroom CoP, are we not simply reflecting institutional, social, and cultural discourses through the exercise of genres and conventions without truly interrogating what they mean and how they may expand? If we can use pragmatic feminist empiricism to acknowledge our own differences, differences in others, and the multiple aims our inquiry may show, we stand a better chance at improving medical technical communications to yield more inclusive discourses.

For these reasons, I have incorporated pragmatic feminist empiricism into the design of courses I teach on all levels in addition to teaching my students how to use it. As the instructor I want to embody what I ask my students to do through modeling—through practicing rhetorical thinking in course design. When I approach course design with rhetorical awareness through pragmatic feminist empiricism, it is easier to demonstrate to my students how the framework can work for them and for others. Once I have designed my course and fully embodied the framework, I begin introducing pragmatic feminist empiricism to my students through an introduction to the classic model of the rhetorical situation to determine purpose, potential audiences, context, and ways to appeal to audiences to achieve the purpose. As a tool, students learn to use pragmatic feminist empiricism in analyzing compositions and designing their own,

just as I have practiced in designing the courses I teach. In teaching students to think rhetorically and exercise pragmatic feminist empiricism, their compositions may add new perspectives to disciplinary domain knowledge inside, across, and beyond the Academy, just as the use of pragmatic feminist empiricism accomplishes adding my perspective to the professional discipline to which I have been enculturated.

The scientific writing classroom is a great place to institute the use of pragmatic feminist empiricism as a rhetorical tool for critical inquiry as students in these environments are learning to be subject matter experts, convention and genre practitioners, and rhetoricians. Students in such contexts are learning the hard skills needed to join their professional CoPs, and pragmatic feminist empiricism equips them with the tools to examine their own values as they influence design while incorporating differences through the acknowledgement of others' embodiments and looking toward the future impacts of their work in scientific fields. An analysis of my own practices as an instructor-as-technical-communicator in the scientific writing course and my students' work reveals ways in which rhetorical intervention through pragmatic feminist empiricism does not only reflect well-known health and medical discourses, but creates and transforms these discourses to contribute to scholarly and professional domain knowledge. I have analyzed my own approach to teaching Scientific Writing in both face-to-face and online iterations and collected data from those experiences and from my students' work in order to demonstrate the application of pragmatic feminist empiricism as a tool for creating and teaching technical communication.

Scientific Writing Course Instruction: An Application of Pragmatic Feminist Empiricism

In designing courses, there are certain institutional requirements that must be taken into account. At East Carolina University, where I designed materials for the Scientific Writing

courses I taught face-to-face and online, I was required to include course goals that were specific for the university as well as the Department of English, in which the course resides. To prepare to design the course, as a technical communicator practicing pragmatic feminist empiricism I began with the first tenet, which requires the technical communicator to acknowledge their own embodiments to identify values.



I began to think about elements of my embodiment that may influence choices I make in the design and selection of course materials. For example, I am a white, heterosexual woman. My race, sex, and gender influence the way I experience the world. These elements of my embodiment directly influence the way I react to certain texts, word choices, and visual designs. For example, when I open an anatomy textbook or visit a scientific museum which displays information about body and organ systems, I notice that most of the representations are not like me—they are sexed as male, as I demonstrate in Chapter IV. When I watch television or drive down the highway, I notice when I am not represented as I feel like I ought to be in ads. I recently saw a billboard advertising air conditioning repair in a major city which read “Your wife is hot. Better call us!” The ad, to me, was intended for a male audience and seemed to be making light of women’s bodies by both objectifying them based on the word “hot” as pertaining to sex appeal and possibly by making light of reproductive changes in women’s bodies that cause hot flashes. I was not amused, and it is directly related to my experience of the world through my embodiments of both sex and gender. I can use my own acknowledgement of my embodiment, however, to provide teaching moments for my students that show them how audience awareness is vital in designing effective technical communications.

My awareness of my own race, sex, and gender influence the choices I make in choosing readings and video clips for my scientific writing classes, which I will discuss in more detail later in the chapter. Sometimes I rely on my own embodiments to talk about examples in class. By always attempting to acknowledge my own embodiments, either for myself or in the presence of others, I can use my own biases to offer perspectives for my students to think about that they might not necessarily share—especially when I am teaching courses such as Scientific Writing that are occupied by a majority of students who identify themselves as being males.

Apart from the embodiments I have already identified, I also have professional embodiments which are the products of my own enculturation into scholarly CoPs that influence my approach to technical communications in the Scientific Writing classroom. As I mention in Chapter I and throughout the dissertation, the complex nature of embodiment entails not only physical attributes—experiences mediated through the self—but attributes of identities formed through professional roles which entail the acquisition and practice of discourses and inform value and belief systems. Professional embodiments, then, mediate experiences of the world and also work to shape technical communications to create, reflect, and transform discourses.

My professional embodiment of practices, conventions, and discourses related to my identity as an instructor—an identity formed through the acquisition of professional certification and subject matter expertise in addition to personal acknowledgement, which grant me the ethos to fully be enculturated by peers and myself into my discipline. Unlike embodiment, ethos—whether professional or personal—is based on perception of experience and identity. As an instructor, my professional embodiment of instructor identity and ethos in addition to my experiences of the world through that embodiment influence the ways in which I approach pedagogy and create communications with and for my students. This professional embodiment is

the result of my educational background, past teaching experiences, and encounters with instructional design. As an employee at a university, another element of my professional embodiment, I am also bound by certain requirements for instruction that impact the way I design technical communications for Scientific Writing. As part of the professional CoP of university instructors, there are genre conventions that are expected as part of one's approaches to designing communications, such as the syllabus, for courses. The syllabus, for example, lists course information and contact information for the instructor. Course goals and intended outcomes are also listed on syllabi. I have caught myself saying the words before, "The University requires us to list this policy on the syllabus." Certain items on the syllabus are also required to appear as part of departmental policy. In addition, there are items that I include based on my past experiences in teaching, such as a paragraph that informs students about how to properly address their instructor via email. This inclusion is part of my own experiences where I have observed that students do not always use formal salutations in email correspondence.

In acknowledging that my professional embodiment as a writing instructor influences design of course materials, another aspect of my embodiment that plays into my experience of valuing difference in the Scientific Writing stems from my areas of expertise. While I am a scholar specializing in medical communications and rhetoric, I do not identify myself as a subject matter expert in all areas of medicine. In acknowledging this aspect of my embodiment in the context of teaching Scientific Writing, I am also acknowledging that there will be moments when I embody more of a role as a layperson—particularly when I am reading research that is specifically tailored to a professional audience situated in the medical field. Embodying the role of a layperson means that I am acknowledging the absence of identity and ethos in the

professional embodiments that being part of a specific discipline might entail—an application of pragmatic feminist empiricism in recognizing differences. While some might view this particular aspect of my embodiment as a weakness, I see it as a strength, for when students are learning to communicate with diverse audiences, they must also consider lay audiences, which will constitute the majority of the public that they serve and represent through their communications in health and medical fields. Embodying the role of the layperson is intentional in this context in order to practice pedagogical pragmatic feminist empiricism to help my students create more inclusive technical communications through their use of pragmatic feminist empiricism. I communicate this idea to my students in our CoP to show them ways in which I am going to learn from what they share as well as critique what they share as a layperson, and that their different embodiments of their disciplines as pre-med and Biology majors when put into conversation with layperson embodiment will add value to shared knowledge in the field, thereby improving technical communications through the acknowledgement and value of multiple perspectives. This acknowledgement of my own embodiment as a layperson and subject matter expert in technical communication in comparison to their different embodiments as subject matter experts in biological science disciplines demonstrates the first two tenets of pragmatic feminist empiricism at work in support of the CoP as adding value to the overall knowledge of the group in working toward a common goal through communicating across and through different embodiments of disciplinary subject matter.

When preparing to design a course such as Scientific Writing, in addition to acknowledging my own embodiments, I follow the second tenet of pragmatic feminist empiricism which requires the technical communicator to acknowledge the embodiments of those who are represented and served by the technical communications.



I have already demonstrated how I enact the acknowledgement of their embodiments and value their differences by contrasting our roles as subject matter experts in different disciplines. Another way I exercise the acknowledgement of their differences in embodiments as adding value to the course is reflected in the ways I choose content for the course. My students are served by the course I design in that they are going to leave class with tools and content knowledge to serve them in their respective disciplines. I interpret “representing” my students in the course by designing assignments that reflect their career goals and their interests as well as materials that reflect and differ from qualities of their embodiments in order to offer them knowledge they can both relate to and draw distinctions from through comparison. This is to say that my students’ career goals and interests are considered when I design the course, thereby allowing the course to reflect elements of their embodiments as budding professionals. I will outline specific course readings, activities, assignments, and other content specifically later in more detail.

The university where I designed the Scientific Writing courses in this study provides information about each student to the instructor before classes start, including both a photograph of each student and the student’s intended major. Because I had access to this information, I could attempt to acknowledge some embodied differences between the students in the course as well as their differences from mine before the class even started. This information was extremely helpful in designing the online version of the course. In the Scientific Writing courses examined in my study, all participants were majoring in biological and health science disciplines including nursing, physical therapy, and pre-med programs save for one student who

was majoring in English. Apart from markers of their disciplinary embodiments, visual markers gave me an idea about the range of racial¹⁵⁷ and gender diversity¹⁵⁸ in the courses. In having conversations with the students via class discussion face-to-face and in discussion forums online to learn more about their interests, students also provide information related to their embodiments that factor into course design for writing assignments that would occur during the course.

In designing a course, there are opportunities for curriculum design and materials to transcend the classroom in several different ways. The third tenet of pragmatic feminist empiricism urges the technical communicator to consider the multiple aims inquiry may serve—how the technical communication might be used in the future to shape discourse.



Like most teaching professionals, I hope the ideas that I communicate to students in my class will transfer, and I am aware that curriculum designs may be shared in and across departments.

While all classes are instructed differently, there are skills such as research, critical analysis, and writing that have the potential to apply in other classes and in careers. The instructor who

¹⁵⁷ I acknowledge that the identification and naming of race is oftentimes difficult to accomplish visually. Pragmatic feminist empiricism does not embrace the use of binaries or specific labels: the framework asks that the technical communicator acknowledge and value differences. Acknowledging that there are visible differences, can at the very least provide an attempt for an instructor to be mindful that there is diversity (or lack thereof) among the students in a course which may impact the workings of the course in interesting ways.

¹⁵⁸ My own embodiment influences my own personal notions of gender diversity, as with racial diversity, where I might construct gender differently than another observer. While the identification of gender diversity based on visual image alone is problematic, it is still useful information to attempt to discern and value differences across a group of people. In following the tradition of Ong's (1975) "The Writer's Audience is Always a Fiction," where the audience is always a construct, I acknowledge that the way I construct gender and apply this to my students based on visual markers alone may be inaccurate or "imagined" when compared to an individual's perception of self-identity and gender embodiment. Though not in the particular courses included in this study of Scientific Writing, I have experienced an encounter where my student's notion of gender construction did not match mine, which was revealed when the student asked me to use a different pronoun instead of the one I had used in class once during future discussions because of the way the student viewed their gender identification.

embodies pragmatic feminist empiricism while designing courses, as I suggest in modeling this approach, will realize this possibility of transcending the classroom space. Predicting the future of the impact and transfer of one's work is a difficult thing to do, but considering the possible uses and implications as well as multiple interpretations of the discourse it creates can aid the instructor in developing more inclusive designs from the initial course planning phases. While I have found much success in using this approach, as with any model of pedagogy, instructors must decide what works best for them.

When an instructor embodies any type of pedagogical modeling in their classes, there is always a chance that elements of the pedagogy will transfer with students to move outside the classroom. In addition, because many departments collect and share materials, there is a possibility that one's course curriculum design may be used or adapted elsewhere, which means that the materials designed for the course have the power to empower or disempower certain student embodiments if differences are not acknowledged and valued during the design process. When various interpretations of the discourse created through design of course curricula are considered, the instructor has the chance to create, reflect, or transform discourses about embodiments through the selection, design, organization, and presentation of course materials.

I designed Scientific Writing with the basic goal of helping students to become more effective communicators in their disciplines. To support this goal, pragmatic feminist empiricism is a tool to help me to communicate with them more effectively, and for them to use to communicate more effectively with a variety of audiences. Because so much of communication is about engagement with different audiences, including professional and lay audiences, the course is framed around the concept of civic science, defined as “scientific inquiry that offers opportunities for participants to develop their capacity to work across differences, create

common resources, and build a democratic way of life” (Abbott, Boyte, Jordan, Ottinger, Peters, and Spencer, 2014, p. 1). The acknowledgment of differences in order to improve life in this definition both supports and is supported by pragmatic feminist empiricism as a methodology. The content, assignments, and interactions for the course support the goals of improving civic science through the application of pragmatic feminist empiricism.

Selecting and Designing Scientific Writing Content

For both iterations of the Scientific Writing course I am analyzing for this case study, I chose readings that would possibly appeal to different types of embodiments present in the course, including my embodiments and those of my students. The readings also engage in the promotion of civic science through engagement with multiple audiences and the acknowledgement of new perspectives, which is a one of the goals of pragmatic feminist empiricism. The major text I chose for the course is a 2009 book by Randy Olson entitled *Don't be Such a Scientist*. In choosing the book, I thought about elements of both the fields of technical communication which I embody and those of biological sciences that my students embody. I found Olson as an individual appealing based on what I learned in researching his professional embodiments. Once a marine biologist who worked rigorously in academia, Olson decided to leave his post and go back to school to study film in order to fuse his interests, using film to communicate ideas about his scholarly interests related to saving the environment to the public. I saw Olson as a possible broker¹⁵⁹ between my own disciplinary and academic embodiments and the disciplinary and pre-professional embodiments of my students. Olson seemed to stand somewhere between all of the elements of embodiment that I could easily locate without even marking my students by features other than their intended majors. When I read his book the first

¹⁵⁹ What I mean by the term “broker” here is one who has the ability to transmit information across multiple communities with success.

time before teaching, I found his notions of embodiment and their role in appealing to the masses to read as rhetorical in that they pointed out origins of communicating persuasively to drive action located in the head, heart, gut, and sex organs (Olson, 2009). To explain this concept, Olson's book represents these elements through a photograph of the well-known actor-turned-politician, Arnold Schwarzenegger, whom both my students and I can easily recognize. The use of Schwarzenegger's embodiments as an actor, bodybuilder, and politician and the reader's possible responses to these embodiments explain how appeals to the head, heart, gut, and sex organs may function. Olson identifies the reader's recognition of Schwarzenegger and his accomplishments as an appeal to the reader's head through reason, his beloved reputation as an action hero to the reader's heart, his career moves from actor to politician to the gut, and his fit appearance an appeal to the sex organs. According to Olson, Schwarzenegger's physical and professional embodiments appeal then, in positive and negative ways, to the viewer—just as communications might. Olson's humorous narrative style also helped to broker major concepts of communication design and scientific disciplinary conventions, since as a scientist and filmmaker he embodies elements of both fields. Olson himself also practices pragmatic feminist empiricism in his work by sharing stories about himself and his embodiments as a professional working in multiple disciplinary fields in addition to sharing anecdotes detailing encounters he has had with individuals whose embodiments differ sharply from his own. In addition, contrary to the possible negative connotation of scientists that the title may seem to promote, Olson resists denigrating professional embodiments in his field and consistently points out the amazing contributions that are made to conservation and other environmental causes that impact the public—while stressing the importance of civic science through honing communication skills to engage with the public.

With Olson's text as a primary read, I also chose supplemental readings for the class in the form of articles and excerpts. I considered several elements pertaining to embodiment when I chose articles and excerpts, including the professional embodiments occupied by the author, gender, and race. I wanted to choose a selection of articles that would provide ways for my students to both identify with authors based on similarities and to acknowledge differences. I wanted to do the same as an instructor—to be able to identify through some of my embodiments with the authors and then to be able to acknowledge and find value in differences between those authors' embodiments. Part of feminist inquiry is asking questions and critiquing prevailing discourses. In education, canonical texts often function as prevailing discourses. I have used pragmatic feminist empiricism to acknowledge the embodiments behind the writing to call canonical texts into question—what about their legacies makes them endure? I often highlight this issue with my students in class to discuss canons in professional fields and find ways for us to both value, challenge, and expand upon them.

While I don't necessarily assign canonical readings for Scientific Writing, I mention canonical figures such as Aristotle, Plato, and Descartes in the lectures I design for the course. Instead of assigning canonical readings, I choose to embody pragmatic feminist empiricism in choosing texts that offer new perspectives on theories by canonical figures. One example is a selection I assign from N. Katherine Hayles's *How We Became Posthuman*, which describes her theory of the Platonic backhand¹⁶⁰ in addition to a Cartesian model of technology. Because I recognize that Hayles is a woman and a scientist enacting critical inquiry of the role of data representation, I immediately acknowledge the value of her experiences as a woman working in scientific fields as having the potential to expand perspectives in class discussion.

¹⁶⁰ See Chapter II.

In addition to readings, I also use TED Talks to teach Scientific Writing. In exercising pragmatic feminist empiricism, I am aware that some of my students' embodiments may affect the way they respond to different types of media, hence I vary course content between text-based and visual and aural presentations of content. TED Talks are a great way to diversify author embodiments and subject matter in any course—they also embody what it means to practice civic science in that they are talks meant to span professional and lay audiences to share ideas. For Scientific Writing, I select a range of TED Talks by individuals from a variety of disciplines in order to offer my students a variety of perspectives on scientific communications issues. When I am selecting TED Talks, I first peruse the “Interactive Transcript” on the TED website that accompanies each video to read the content of the video. I also pay attention to the embodiments of the speaker once again, making an effort to choose talks to show in class and assign to my students that offer multiple perspectives channeled through a variety of embodiments.

Just as I excerpted Hayles' *How We Became Posthuman* for my students based on the embodiments of the authors in addition to the content, I show Paula Johnson's 2013 TED Talk entitled “His and Hers...Healthcare.” Johnson's talk demonstrates the importance of acknowledging differences in sex on the cellular level, identifying the value of studying differences in order to learn how to offer better treatments for and expand definitions of heart disease. Johnson's talk is one that I found very influential in how I designed pragmatic feminist empiricism, as I see Johnson practicing the three tenets in her talk in her acknowledgment of her own embodiment of sex, the acknowledgment of valuing differences in others, and her questioning the future of medicine if disease definitions are not expanded. Apart from her practice of pragmatic feminist empiricism, Johnson's own embodiments of sex, gender, race, and professional identity also add value to our classroom knowledge base toward achieving course

goals and applying pragmatic feminist empiricism in order to create more inclusive communications. The use of Johnson's TED Talk also is a great segue into a discussion I have with my students about the Visible Human Project and its potential to expand in addition to what my students observe in their anatomy textbooks as far as how bodies are represented. Through these types of discussions, my students use pragmatic feminist empiricism to locate exigencies and to critique prevailing discourses that have the potential to marginalize certain embodiments.

To help my students understand how pragmatic feminist empiricism can be used to provide solutions to the exigencies they learn to identify through the framework, I also show a TED Talk entitled "It's Time to Redesign Medical Data" by Thomas Goetz, a medical writer and founder of a company specializing in visual design of medical communications. Although Goetz is not a medical doctor or clinical researcher, his work in visual design of data in medical communications is useful in teaching my students how the public will react and be impacted by the design of medical communications. Goetz is practicing civic science in every sense of the definition, through engaging with a variety of different audiences in order to improve access to knowledge about medical technologies such as prescription medication and other drug communications. In addition, Goetz presents solutions to the way medical data is communicated to the public by simplifying dense information into more streamlined charts and bar graphs and using less prose-heavy forms in general. Following our discussion of Goetz's TED Talk, I refer back to class discussions of the Visible Human Project and anatomy textbooks and ask my students to use pragmatic feminist empiricism to address some of the exigencies they have observed in those projects.

In the online Scientific Writing course where I have collected data, I assigned Elise Roy's 2015 TED Talk entitled "When We Design for Disability, We All Benefit" for the first time as

part of the discussion in the class related to the design of wheelchair accessible signs. Through discussion board posts, one of my students revealed that she uses a wheelchair. The engagement of the class in that discussion of (dis)ability and universal design was an excellent example of pragmatic feminist empiricism working to create value and expand definitions of health and disease to be more inclusive. That conversation, resulting from my student's acknowledgment of her own embodiment and from the acknowledged value of her difference by other students in a discussion has led me to use Roy's TED Talk in every Scientific Writing course I teach, including the face-to-face version of the course from whence I have collected data in my study of pragmatic feminist empiricism as a pedagogical tool.

Designing Major Assignments for Scientific Writing

Scientific Writing consists of three major writing projects including a field study, research review article, and lay science article. In addition to the major writing projects, I also assign a midterm exam and final essay exam. The design of the major projects is decided upon before I meet with my class or have access to their demographics and majors. The projects for the course are scaffolded, meaning that the skills used in one project will be used and built upon in the next project. When viewed together, the projects work as a tool for enculturation to help students develop communications suited for the professional realm and to reach beyond that realm into the public—emphasizing the importance of civic science. As for the midterm and final essay exams, I wait until I have spent time getting to know each class and growing to understand and acknowledge their interests before I craft the assessments. I will address this decision after reviewing the design of the three major writing projects.

Because I design the major writing projects without being able to acknowledge specific embodiments of my students, I use what I know about their student roles to construct the

assignments. In acknowledging that my students are budding professionals, I assign a field study project for them. In the field study, students must identify the professional field they are working toward joining, then they must write about four topics: 1) a brief summary of the field chosen; 2) a list of authoritative sources (journals, websites, conferences) relevant to the field and detailed annotations of those sources; 3) a list of research topics relevant to the field chosen; and 4) a general analysis of communication in the chosen field (“Field Study,” 2016). The field study is a means of getting students to learn more about their discipline—more about the professional identity they are seeking to embody through getting their degree. In the field study, they are encouraged to examine how their own embodiments of sex, gender, and race might impact their enculturation into that professional identity and how these embodiments might help them to engage in civic science outside of their CoP.

The research review article builds on skills acquired in the process of examining communication practices in the field by asking students to identify an issue in their area of study and investigate the issue. Students are to observe the language and genre conventions used in publications in their field study; the research review article is the acquisition and practice of adopting those writing practices to appeal to one’s own field. While this assignment seems commonplace and is framed by the rhetorical situation, when put into the context of pragmatic feminist empiricism the assignment can help students to consider the impact of their research in spheres beyond what they intend. In addition, pragmatic feminist empiricism also helps students to think critically about how their communications can become more inclusive through a direct acknowledgement of their own embodiments and those of the audiences which they represent and serve. The assignment description reads “You will choose one of the research topics that you identified in working through the Field Study and write a research review article that reviews,

summarizes, and communicates the state of research to an audience of scientists interested in your topic” (“Research Review,” 2016). As an extension of traditional rhetorical framework, pragmatic feminist empiricism still is an audience-driven approach to pedagogy—an audience-drive approach that considers future impacts of the work.

It is also worth noting that although the research review assignment may appear to identify scientists as a single, homologous embodiment as the intended audience, I argue that within disciplinary fields there are multiple roles and embodiments working together with a shared goal. In addition, the assignment identifies the audience as “scientists interested in your topic.” The loose, though field-focused description of the assignment’s audience is intended to promote the use of the second tenet of pragmatic feminist empiricism, where the student should acknowledge differences in embodiments of various practitioners within their disciplines and their value in order to provide clear, inclusive communication. When working in scientific fields, there are various roles within medical settings which may share subject matter expertise but embody this knowledge in different ways. There are not only research scientists who may be interested in a topic such as dentistry, for example—general dental providers, biomedical engineers, and artisans who design prosthetics may also comprise the type of disciplinary audience targeted in this assignment. These professional embodiments may communicate or access information in different ways, so students must take account of these field-specific differences that occur within their field when crafting their assignments.

The lay science article is a departure from the research review article in that it asks students to revise their research review article for a lay audience encompassing more embodiments than the more specific various disciplinarily-interested audience I describe in the previous section. The act of writing the research review article effectively simulates students’

enculturation into their discipline of choice; the lay article asks them to acknowledge different embodiments that may exist in a lay audience that will impact the way they revise to communicate with those embodiments. By approaching the assignment with the application of pragmatic feminist empiricism, students engage in critical awareness of how valuing multiple embodiments expands definitions of health and disease to be more inclusive. This is the project where students get to engage in civic science directly, not only writing for a specific audience, but considering the larger impacts of their work to create, reflect, and transform discourses about health and disease in present and future contexts.

The lay science article also gives students the choice to compose either in written text or via new media to create a visual text such as a PowerPoint or poster presentation. In composing the lay science article, students learn to identify and value the diverse embodiments that are represented and served by their communications on a grander scale than the research review article requires them. To appeal to potential audiences comprised of various embodiments, including those outside of their discipline, consideration must be given to the medium in which the students compose. In addition, they must consider in identifying potential audiences how their communications may be used, which lends itself to the third tenet of pragmatic feminist empiricism that asks students to consider the multiple aims their inquiry may show.

As I mentioned, the midterm exam is designed once I have taken the time to learn more about the embodiments of my students and to examine the interactions that have occurred in our classroom discussions in order to craft appropriate questions. The midterm consists of a section devoted to defining vocabulary words through multiple choice or fill-in-the-blank, a short answer section, and an essay question offering a scenario for students to consider how they would communicate to different audiences and share information related to a public health crisis. While

the vocabulary section of the exam is designed once I have selected the readings for the course and does not change based on the embodiments of the students in my class, the short answer and essay questions do. For example, the midterm for the online version of Scientific Writing had one short answer question which referenced accessible sign designs—a question I designed for the online section of the course based on a forum discussion related directly to one student’s embodiment of (dis)ability, a discussion thread she shared relating to her use of a wheelchair. Because the discussion had been so powerful, I wanted to include a question that reminded students about that discussion and to ask them to think more about how communications are designed. In another example, in the face-to-face course I designed a special essay question providing a scenario of a scientist who had to communicate her findings about a pollutant in a dairy manufacturer’s facilities to stakeholders and the public—a question based on an overwhelming interest in the work of Barry Marshall, an internist, who won a Nobel Prize in 2005 along with Robin Warren upon drinking a bacterium to prove his theory regarding treatment for stomach ulcers (Marshall & Adams, 2008). In the discussion of Marshall, my students—an abundance of which were aspiring internists—debated safety and ethics and just how much one can or should embody research, in addition to the function of IRB in protecting the researcher. In designing the midterm for both the online and face-to-face courses, I had to acknowledge my own embodiment as the instructor in upholding institutional policies regarding the course material, but I also needed to acknowledge the value of difference in embodiments of my students in the course and give them opportunities to think more through designing questions based on their interests. If my goal is to teach them to engage in civic science and create more inclusive communications that value difference, then I must consider what I ask them to think

about on the exam and how I ask them to think about it so when they go into their careers they use the framework effectively and can share it with others in a palatable way.

Since I embed pragmatic feminist empiricism into the structure of our course from the very first week of school, I ask my students to reflect on this experience in their final essay exam for the class. The final essay exam is a take-home written assignment which asks students to address their approaches to scientific communication. I ask them specifically to respond to the following three components, which align with the three tenets of pragmatic feminist empiricism:

- Reflecting on your experience of civic science in this class, how do aspects of your embodiment, your overall identity—sex, race, gender, class, current status as a student professional, etc.—impact how you engage with your audiences?
- How did the embodiments of your audiences impact the way you communicated with them? What considerations did you make about how you imagined these audiences? Are there times you changed word choices, concrete examples, and metaphors, for example, to appeal more to a broader essence of those audiences?
- What opportunities do you see for the work you researched and produced to reach beyond the intended audiences? For example, could you see a student picking up your research article and using the information about your topic in a new way that you hadn't imagined? (“Final Essay Exam,” 2016)

In getting students to reflect on how they have applied pragmatic feminist empiricism in the class, it is my hope that they will continue to incorporate the framework into professional communications when they enter their careers and when they use their research to engage in civic science. The final essay exam also allows me to measure how effective the pedagogical model of pragmatic feminist empiricism is working to get students to think and acknowledge

embodiments in the formation of discourses that may transcend intended audiences and influence public health through civic science.

Design of Interactions in Scientific Writing

One of the components of grading and assessment in both sections of Scientific Writing is interaction or engagement with materials and colleagues. In the face-to-face course, speaking up during class discussions is one way to gauge interaction and engagement. Class discussions are part of the daily workings of the face-to-face course. To simulate class discussions in the online iteration of the course, I assign discussion boards where students must write an initial post reflecting on the readings for the week and must engage with at least two classmates' posts. This method is very effective in getting students to interact with one another, and because the very first discussion board post is for students to introduce themselves, there is already acknowledgment of embodiments happening in the public forum from the first week of class. Many students share their majors and career goals, while some will offer more personal information such as their hobbies and tastes in music. In an effort to practice the second tenet myself, I respond to each student's discussion board post and identify a specific aspect of their embodiment which I find interesting and different from my own, such as one student's Native American¹⁶¹ heritage and legacy of medical education in her family, which she was excited to share with the class. I take time to have students introduce themselves in the face-to-face version as well and enact this same acknowledgement and value of differences. For example, one student in the face-to-face course was an English major and interested in becoming a medical writer, so I

¹⁶¹ I use the phrasing "Native American" because this is the terminology my student prefers. As someone who does not identify with this heritage, I only have constructions of what it means to have this identity; therefore, I find it respectful to use the preferred terminology for those whom I reference in conversation when I have access to those terms.

made sure to acknowledge that his contributions to the course could offer a new perspective to all of the pre-med students around him.

To support the theme of civic science as a course goal in both iterations of the course, I ask students to demonstrate engagement and interaction on the social media platform Twitter. For each section of the course, I identify an original hashtag for students to tag posts in order to make them easily searchable. Interaction on Twitter promotes sharing ideas and responding to others and situates our CoP within a network of professionals and laypersons. Students are required to share posts from a variety of sources that they find interesting and related to the course content or their own field-specific research. The use of Twitter in this way allows students to share posts with a wide audience that reflect their embodiments through sharing what their focused research interests entails. In addition, Twitter allows students to acknowledge different embodiments based on the identification and sharing of content not necessarily found in their specialized research interests. Finally, the practice of sharing publicly stresses the importance of the third tenet of pragmatic feminist empiricism, which encourages students to think about the impacts of the communications they share not only in their CoP as an audience, but beyond that intended audience in the realm of the public. In the spirit of embodying pragmatic feminist empiricism as a technical communicator who is teaching other technical communicators, I also engage through social media interaction through Twitter posts with the unique hashtag and through sharing posts with the tag.

Scientific Writing Course Student Applications of Pragmatic Feminist Empiricism

In Scientific Writing, I have created a lecture that is devoted to the instruction in and promotion of pragmatic feminist empiricism in relation to scientific communication. I introduce the framework to students a bit through extrapolating the term “civic science” during the week of

contact. I then explain the CoP model and the rhetorical situation before moving into the major details of pragmatic feminist empiricism. To explain and model the framework, I often use the case of Yentl Syndrome which I discussed in Chapter I. I use this example based on the nature of the course, first of all, as being titled “Scientific Writing.” Whether they are pre-med students or students in other disciplines, I offer enough background information for the lay audience to understand—especially since I introduce pragmatic feminist empiricism so early in the course and do not have thorough access to specific elements of the individual embodiments of the students enrolled in the course, such as their niche interests in science and health fields.

I have already outlined my own embodiment of pragmatic feminist empiricism in designing the course, and I have alluded to some student examples. In the following portion of the chapter, I will provide examples of how students have learned to use pragmatic feminist empiricism in their own work for the course. I have collected data from two sections of Scientific Writing, including one face-to-face section and one online section. I requested student participation via a secured informed consent document, which I did not have access to until grades were posted for each respective course.¹⁶² Out of fifty total students who were invited to participate in the study, forty students opted to allow me to use their work to illustrate applications of pragmatic feminist empiricism. All names of students will be protected in the examples that follow. In order to analyze the application of the framework, each narrative will pertain to tenets of pragmatic feminist empiricism and examples will demonstrate the use of the tenet in the five major assignments as well as interactions in class discussion and engagement through Twitter.

¹⁶² Protocol: UMCIRB 16-001479, “Pragmatic Feminist Empiricism as Pedagogical Tool”

Tenet 1: Acknowledgement of One's Own Embodiment

Major assignments. In the three main writing projects for the course, which are scaffolded to build and review skills from project-to-project, I ask students to think about their own embodiments of their disciplines in addition to other personal aspects of embodiment that impact scientific communication practices. The other two major assignments, the midterm and final essay exam, also ask students to acknowledge and use their embodiments to communicate. Student A, while not the only individual to exercise this acknowledgement of personal embodiment, did so in all five major assignments.

Student A in the field study disclosed an element of personal embodiment that led the individual to study optometry, writing: “As a person who has struggled with vision problems for nearly my entire life and who has a strong desire to help people, I hope to obtain a Doctor of Optometry degree.” In beginning with this acknowledgement of embodiment pertaining to vision problems, Student A identifies why they are interested in pursuing a particular area of study. While some might identify revealing elements of personal embodiment as an origin of bias in perspective, pragmatic feminist empiricism identifies value in self-acknowledgment, as biases do not necessarily have to be negative.

Student A continued to use this acknowledgement of embodiment in the research review article as well, writing an article on contact lens advancements. Student A writes, “Although these advances are not directly related to the primary focus of an optometrist they do concern many diseases that individuals, including myself, struggle with every day in finding the right lenses.” Again, Student A acknowledges their embodiment in an effort to connect with readers—professional readers—and promote civic science through identification with a broader public. The identification of the student’s embodiment of eye disease in the research review article also

grants them authorial ethos in communicating not only through a professional embodiment of language and convention, but through personal experience.

For their revision of the research review article into a lay science article, Student A continued to acknowledge their own embodiment of eye disease to communicate to the public. Student A reflected on their experience of creating a PowerPoint for a lay audience from the original research review article similar to informative ads that are streamed in optometrist's offices. Student A writes that "I steered away from the bland and colorless versions that I have seen used in the optometry and vision field before because they are terribly boring and almost painful to look at." Drawing Student A's own experience of visiting the optometrist's office for vision issues, the individual once again relies on acknowledging their own embodiment in order to improve communication design for a broader audience.

While Student A was not the only example of using the first tenet of pragmatic feminist empiricism in the major projects, the examples demonstrate the idea of how the projects are scaffolded. As for the midterm exams, Student A also referenced their embodiment of vision impairments in a particular question regarding the rhetorical situation and ethos, where the student noted that "Because I have eye disease, I can practice what I preach when I become an optometrist and hopefully my patients will trust me more with their vision needs." In the final essay exam, Student A continued to acknowledge their embodiment as a source of strength in ethos throughout the course, noting that "All of my writing this semester was about optometry or contact lenses. I've worn glasses and contacts for my entire life so this also gave me more credit when writing about those topics because I was able to speak about my own experiences."

Interactions. Class discussions, discussion board posts, and social media engagement through Twitter provided ample opportunities for students to acknowledge their own

embodiments. Class discussions and discussion board posts were based on assigned readings and students are encouraged to explore and relate to the concepts covered in those readings. Twitter is also a place where students are encouraged to share research and ideas that are important to their own scholarly and personal interests that fit within the scope of scientific communication. Students B and C are great examples of how one can acknowledge personal embodiments both inside a CoP and in the public forum.

Student B, an aspiring physical therapist, shared a personal story about tearing their ACL¹⁶³ at a sports event during a class discussion on surgical technologies and patient communication. Student B had been informed they had to make a decision about a procedure to remedy the torn ACL through a new technology, and upon researching writing on the technology, Student B felt comfortable with the ratio between risk and reward. Student B acknowledged that the comfort level in electing to have the surgery stemmed from their embodiment of disciplinary knowledge, admitting that a lay person might not have understood the risk/reward ratio because of the use of specialized language specific to the field of physical therapy regarding muscle movement. To help their fellow students understand more about the ACL and the surgery, Student B stood up and pointed to their own muscles while explaining the procedure they had undergone to repair it. In acknowledging their own position as a part of a discipline with access to specialized language and physiology, Student B demonstrated the value of acknowledging the limitations and benefits of communicating about surgical technologies across CoPs to the lay audience.

Student C acknowledged via a discussion board post their experience with migraine headaches and noted that there are differences in how conditions manifest. Student C writes:

As a former victim of migraines, I can tell you that for each person, the migraine

¹⁶³ "ACL" stands for "anterior cruciate ligament," which is located in the knee and joins the thigh and shin bones.

differs. Migraines come in various areas and pain levels. They can range from just a nuisance behind one eye to a crippling pain that causes its victim to be bedridden.

My migraines always come with a warning. This means that I get pre-migraine symptoms like auras which appear as spots across my vision, and also gives the world a yellow hue.

One of my friends gets chronic migraines, and hers do not give any prerequisite warnings. While mine make me severely nauseous, hers cause severe confusion and fatigue.

The conversation led to an interesting thread on the importance of communication practices for conditions bearing symptoms that cannot be observed with the naked eye. Student C, in acknowledging her own embodiment, used migraine headaches as a way to talk about how conditions operate differently in every embodiment; therefore, using pragmatic feminist empiricism to show that differences should be acknowledged during treatment.

Student C also acknowledged their embodiment of migraine headache experience through social media engagement, posting links to various sites offering solutions for migraine sufferers, including clinical trials involving the use of melatonin¹⁶⁴ in headache prevention. Through their own embodiment, Student C was able to further engage by offering personal commentary on their experiences using melatonin to combat migraines.

Tenet 2: Acknowledgement and Valuing of Difference in Others' Embodiments

Major Assignments. While I work with students to acknowledge their own embodiments, many times recognition of one's own embodiments leads to seeing differences in the embodiments of others more clearly. The next step is to find the value in those differences and to identify the potential to create more inclusive communications through acknowledgement of the different types of embodiments represented and served by the technical communication.

¹⁶⁴ Melatonin is a hormone produced during the sleep cycle to regulate rest patterns (Mayo Clinic, 2017).

Student D, like Student A, executed the application of this tenet in all of the major assignments for the course.

In the field study, Student D applied the second tenet of pragmatic feminist empiricism to note that there is a gender gap in the field of nursing. Student D writes that “Nursing is a profession traditionally dominated by women; however, this tradition still is in place today and could benefit from diversifying to include more men.” Student D acknowledges differences between at least two gender identities and acknowledges that the nursing profession may benefit from multiple perspectives if more men were to work in the industry.

In their research review article, Student D applies the second tenet of pragmatic feminist empiricism in order to demonstrate the importance of hospice nurses as technical communicators brokering between patients at the end of life and family members who are grieving before their loved one passes away. Student D writes “Hospice nurses have the ability to stand in the middle of the living and the dying. They have seen people die and their experiences in handling death help them to be able to communicate with both the dying patient and the family in different ways.” In the project the writer is speaking as a professional, so my interpretation of this statement from Student D is that they are standing in the position of the hospice nurse, acknowledging the perspectives of both the embodiments of death and life between the patient and the family members in order to shape communication practices to be most effective for both parties. The acknowledgment of the nurse’s experiences of both death and life also reflect the first tenet of pragmatic feminist empiricism, if Student D is truly speaking as a voice in the field of hospice nursing as the assignment requires.

When tasked with writing a lay science article, Student D continued to acknowledge different embodiments. In their reflection on creating a brochure for families of patients at the end of life, Student D points out:

This brochure is for families of dying patients, and I'm trying to represent the experience of having a chronic, terminal condition to them and help them cope with grief. I have to be sensitive and imagine what it's like to be close to the end, while at the same time telling someone who loves the patient how to prepare for impending death and grief.

Student D's powerful acknowledgement of how communications that are meant for grieving families are actually working to represent those who are dying demonstrates how the technical communicator can value difference in multiple embodiments to gain new perspectives in creating inclusive definitions health and disease, including death.

Student D also applied the second tenet in the midterm as well as the final essay exam. In their midterm exam in response to the question "What is one way that we can make scientific concepts more readable? Why/how does this help readers?" Student D identified the importance of studying the intended audience as well as secondary audiences in order to find the best method. Student D also mentioned accessibility as an important factor in making design decisions, naming visual and aural ability as modes that must be considered. In the final essay exam, Student D referred to embodiments of their classmates as being different from their own based on ethnicity, noting that "Being in a group of black males has given me some new ideas about how others struggle as a minority in a profession dominated primarily by white women." The notion that Student D is both identifying with and seeing themselves set apart from the group members they reference is a direct correlation between both the first and second tenets of

pragmatic feminist empiricism, where the individual is finding value in multiple perspectives, including their own.

Interactions. As part of engaging the courses in class discussion of stasis theory, which entails bringing multiple perspectives on an debatable issue into conversation and arriving at a consensus regarding how to proceed in finding solutions, I encouraged students to practice pragmatic feminist empiricism in small groups through an activity involving the investigation of global warming. When the small groups completed their assignment, the class reconvened to engage in discussion. Student E raised their hand and offered a summary of stasis theory, noting that while each member of the group investigated different perspectives about global warming, in order to devise an agreed-upon stasis about the issue there had to be an acknowledgement of differences in perspectives. Through a discussion of the various stakeholders students identified in the global warming investigation, which included the public, climatologists, and automakers among others, Student E and their classmates imagined the contributions that different embodiments might make to promoting global warming as a real phenomenon to the general public through the use of a short skit portraying a town hall meeting in Washington, North Carolina, the location of a coastal Carolina estuary. In a similar discussion via discussion board posts, Student F identified the importance of valuing all stakeholders in global warming debates, focusing on automakers who are often criticized and undervalued in climate change conversations, pointing out that “With their knowledge and know-how, industries who are labeled as culprits in the pollution debate have the technology and the money to find ways to make cars with less emissions and make themselves plenty of money while doing it.” Student F makes a great point in identifying value where it is often criticized.

Student G through social media engagement used Twitter as a means of investigating scientific fields with which they did not necessarily identify, which was a purposeful acknowledgement of their own embodiment of non-scientific scholarship in an effort to acknowledge values in scientific disciplines. Student G is not a pre-med or biological sciences major, but enrolled in the course with an interest in learning more about science. With that in mind, Student G began studying multiple scientific genres through Twitter before deciding that their favorite area was that of wildlife conservation, where they hoped to add value to the field through their own specialized skills in writing creatively, thereby using their embodiment of creative writing values to rhetorically impact and practice conservation efforts.

Tenet 3: Consideration of the Multiple Aims Inquiry May Show

Major Assignments. In teaching my students the importance of the rhetorical situation early on the course, they learn to be aware of audiences quickly. Part of recognizing the multiple aims inquiry may show is being able to predict what audiences may gain access to one's work and how they might interpret it. One's communications can have extremely profound impacts on discourses that empower or disempower certain embodiments. In health fields, for example, bodily discourses become critical to saving lives. Student H identified emergency medicine as an area in which discourses created and reflected in technical communications become critical to preserving life. Student H in their field study worked to identify sources for keeping emergency situation protocols up-to-date, recognizing that changes in medicine and technology can impact treatments:

Professionals in emergency medicine are trained in handling injuries and illnesses that pose a very immediate threat to the lives of their patients. Occupations in emergency medicine include emergency physicians, physician assistants, nurses, and emergency

medical technicians (EMTs). All of these positions require knowledge of the latest information in emergency medicine for the professional to operate most effectively. Student H also goes on to write about the importance of communication on-the-job about patients in critical situations, noting that the way patients are discussed can impact the patient's stress level, and communicate to the public beyond the patient encounter that emergency medical workers are insensitive to the humanity of those they treat.

In their research review article, Student H continues studying the importance of communicating across various channels as an emergency medical worker in order to provide equal, ethical care for patients in all types of embodiments. Through an investigation of the time it takes to respond to patient needs, Student H found that there are disparities based on the availability of training and resources—elements which are beyond the professionals' control. Student H found that the public misinterprets disparities in response time to be rooted in discriminatory practices based on age, race, and socioeconomic status and that discourses created by this misunderstanding perpetuate negative discourses which dissuade the public from using emergency services. Instead, the problem with response times, according to Student H, is working through traffic effectively and overcoming other elements related to accessing locations in many cases which could benefit from the acquisition of resources and training for emergency workers. Student H also recommended that better simulation training and involvement of the public in training sessions might also help to create more inclusive discourses about health and disease as they relate to embodiments that are served by emergency medicine in the particular area Student H studied.

Student H designed an informative tract for their lay science article, revising the research review article for lay audiences. In the tract, Student H offered advice to the public on ways to

buy time for emergency medical workers to respond to calls to 911. Student H first explained the problem and dispelled beliefs about emergency medical workers responding slower to certain patients, identifying reasons for delays. They then provided information about how emergency medicine as a field is working to combat time in order to provide faster, better care for all patients:

As time passes, more research is being conducted to increase the success of emergency responders. When new issues are identified, new studies begin to look for ways to correct the problems that have been found. Emergency medicine services are continually working to improve, and so are the researchers who help them. Thank a researcher and a first responder today!

By identifying popular beliefs about delayed response in emergency medicine that might be interpreted as discrimination, Student H draws attention to the issue and shares the underlying causes then offers a solution to create more positive discourses about emergency medical services through public engagement with the publication of the tract to create awareness of why and how emergency response teams need to do their jobs to serve multiple embodiments. Student H proposed in a memo accompanying the tract that through awareness of how the public can work with emergency response teams, discourses that appear to frame response time delays as an issue in discrimination may be dispelled through open communication and collaboration between the public and emergency medical workers, thereby acknowledging that multiple embodiments are valuable to emergency response teams in practice and in collaborating with the public to reduce response times.

On the midterm exam, Student H answered a question regarding design and layout of communications with the public with a scenario based on their work in emergency medicine to

dispel beliefs that there are discriminatory factors that lead workers to respond slower including age, condition, and race. To look ahead and forestall this type of generalization by any viewers of public communications, Student H suggested the inclusion of visuals that depict multiple embodiments including senior citizens, young adults, and multiple races. In their final exam essay, Student H expressed a desire to redesign both training manuals and public communications in emergency medicine, pointing specifically to discourses which seem to communicate that senior citizens call upon emergency medicine workers the most, and probably do not need them to work as hard to keep them alive since they are closer to the end of life due to advanced age.

Interactions. A class discussion and discussion board thread helped students in both classes to identify the impact of visual design on discourses about health and disease. In stasis discussions on whether or not to put warning labels on fried foods, Students I and J in different course iterations brought up the popular belief that individuals with elevated BMIs are often labeled as “unhealthy” and are the primary consumers of fried foods. Student I remarked that “There are always overweight people used in advertisements about cholesterol medication.” Student J wrote that “By using only pictures of obese people, it looks like the risk of fried foods and diseases that they cause are only present if you look like them.” Both Students I and J exercised thinking ahead of the communication design of ads and news stories geared toward promoting labels for fried foods, showing that stigmas regarding health and risk in individuals with certain embodiments are attached to visual communications and that the discourses of health and risk need to be expanded to include other embodiments in order to improve public health and awareness.

On Twitter Student K, who is studying Zika virus transmission, pointed out through a series of posts that the burden of preventing the spread of the disease is being targeted primarily at women due to the high number and shocking images of cases of babies born with microcephaly. According to Student K, mainstream media contributes to placing the primary burden on women because of the impact of the visual image of the effects of microcephaly, when in fact, men are affected by Zika and are carriers of the virus. Student K shared a post from the CDC which bears the image of a cartoon pregnant woman being seen by a physician. In addition, the site lists information for women who are pregnant or intending to become pregnant first about prevention and what to do if they experience symptoms.

In the forty consenting participants' documents, there are many examples of how students in Scientific Writing learn to apply pragmatic feminist empiricism through critique and design of technical communications in scientific disciplines. By becoming aware of embodiment and the role that embodiments play in the formation of discourses that may empower or disempower certain groups, students learn to take steps to create more inclusive technical communications that lead to inclusive, expanded definitions of health and disease to improve public health.

Conclusion: Applying Pragmatic Feminist Empiricism Pedagogy beyond Scientific Writing

As I have demonstrated in this chapter, instructors can incorporate pragmatic feminist empiricism into their own methods of designing courses. By exercising the first tenet of pragmatic feminist empiricism to look inward, the instructor acknowledges personal embodiments and may identify both positive and negative biases in these embodiments that have the potential to affect course design and instruction. In using the second tenet of pragmatic feminist empiricism to study the embodiments of the students they are meant to serve through course design as technical communication, the instructor can learn to value differences that will

offer new perspectives on topics in the field of study as well as cultivate new knowledge through multiple experiences of course content. Lastly, in thinking about how the course as technical communication may create, reflect, or transform discourse beyond the classroom, the instructor can develop and foster inclusivity to expand knowledge on course content.

The steps I have described above should not only apply to instructional design in Scientific Writing, but should be implemented to design any course to become more inclusive. While I developed pragmatic feminist empiricism specifically for medical technical communicators, its use across all disciplines can help to make technical communications more inclusive to empower who they represent. For example, a course in writing for Business where the instructor designs the class using pragmatic feminist empiricism may also work to expand knowledge in the discipline. Because Business is an industry historically, like Science, dominated by male embodiments, an instructor might use pragmatic feminist empiricism in course design to decenter gender stereotypes about Business and industry. At the very least, practicing pragmatic feminist empiricism in designing a course like writing for Business can help the instructor engage in critical inquiry to call prevailing discourses into question and possibly continue inquiry beyond the classroom through sharing materials across departments. In any fields where there are groups who are marginalized because of their embodiments, pragmatic feminist empiricism should be implemented in order to critique technical communications that perpetuate prevailing discourses that disempower and to aid in the development of more expansive technical communications designed to value multiple perspectives. In demonstrating the application of pragmatic feminist empiricism to instructional design and its use as a teaching tool for students in Scientific Writing, I have shown in this chapter how valuable the tool can be for creating more inclusive discourses about embodiments—not only those related to how health

and disease are defined, but discourses that tend to empower or disempower groups based on features of their embodiments.

As I have mentioned throughout the dissertation, pragmatic feminist empiricism calls prevailing discourses into question that privilege certain embodiments, including sex, which I mention, and also has the potential to call out matters of privilege regarding race and gender. Prevailing discourses are present not only in medical contexts, but in many others including institutions of higher education, justice systems, economic systems, and so many more. These discourses are not limited to one region of the world—they are present in international organizations as well, and they deserve inquiry. Discourses are part of the fabric of experience that comes from the interactions of embodiments across all disciplines, and with the many unique embodiments that encompass a single body—much less a national or global body—there is a need to value difference and promote inclusive conversations in order to improve the world for everyone.

I have offered a context of visual medical technical communication for the development and application of the framework, and I cannot stress enough how important it is to use pragmatic feminist empiricism every day when designing communications. Every day there are people who are disempowered because of their sex, race, or gender. There are people who are disempowered because of their nationality, language, wealth. Embodiment in countless forms becomes grounds for marginalization. This happens daily. Until we can learn to acknowledge and value differences, there will be voices which are silenced. Perspectives that may benefit the larger understanding of the human experience and the human condition will go unnoticed. It is my hope that technical communicators across disciplines, across any boundaries, can use this framework to call prevailing discourses into question, trace the origins of their own discourses,

and work to design more inclusive technical communications through the application of pragmatic feminist empiricism. When we do better to value multiple perspectives, we do better to value everyone.

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APPENDIX: IRB STUDY INFORMATION



EAST CAROLINA UNIVERSITY

University & Medical Center Institutional Review Board Office

4N-70 Brody Medical Sciences Building · Mail Stop 682

600 Moyer Boulevard · Greenville, NC 27834

Office 252-744-2914 · Fax 252-744-2284 · www.ecu.edu/irb

Notification of Exempt Certification

From: Social/Behavioral IRB

To: [Alana Baker](#)

CC: [Erin Frost](#)

Date: 8/16/2016

Re: [UMCIRB 16-001479](#)
Pragmatic Feminist Empiricism as Pedagogical Tool

I am pleased to inform you that your research submission has been certified as exempt on 8/16/2016. This study is eligible for Exempt Certification under category #1.

It is your responsibility to ensure that this research is conducted in the manner reported in your application and/or protocol, as well as being consistent with the ethical principles of the Belmont Report and your profession.

This research study does not require any additional interaction with the UMCIRB unless there are proposed changes to this study. Any change, prior to implementing that change, must be submitted to the UMCIRB for review and approval. The UMCIRB will determine if the change impacts the eligibility of the research for exempt status. If more substantive review is required, you will be notified within five business days.

The UMCIRB office will hold your exemption application for a period of five years from the date of this letter. If you wish to continue this protocol beyond this period, you will need to submit an Exemption Certification request at least 30 days before the end of the five year period.

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

