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The Relevance of Feenberg's Critical Theory of Technology to Critical Visual Literacy: The Case of Scientific and Technical Illustrations

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THE RELEVANCE OF FEENBERG'S CRITICAL THEORY OF TECHNOLOGY TO CRITICAL VISUAL LITERACY: THE CASE OF SCIENTIFIC AND TECHNICAL ILLUSTRATIONS

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ABSTRACT

Andrew Feenberg's critical theory of technology is an underutilized, relatively unknown resource in technical communication which could be exploited not only for its potential clarification of large social issues that involve our discipline, but also specifically toward the development of a critical theory of illustrations. Applications of critical theory help strengthen our discipline by forcing us to delineate extant approaches and consider whether democratic goals are being achieved through those approaches. If a critical theory of illustrations can be built from Feenberg's critical theory of technology, it should be useful for classroom instructors and researchers as well as theorists.

TECHNOLOGY vs. NATURE

In Andrew Darley's recent complaint about the BBC's series *Walking with Dinosaurs* he states that society is imperiled when "images . . . stand in for the real thing" [1, p. 247]. The prehistoric images to which he refers are computer-generated, technological artifacts. Culture, nature, and personal experience (the "real things" to Darley) are threatened by technology. In *Critical Theory of Technology,* Andrew Feenberg warns us about the Andrew Darleys of the world: "Social critics claim that technical rationality and human values contend for the soul of modern man" [2, p. 3]. This opposition between nature and technology, between human vs. non-human/inhuman, is presented in terms

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that make the good/evil judgments apparent. Humans and nature are sacred, jeopardized by technological products and processes.

For those of us interested in visual communication as an intersection of the human and the technological, scientific illustrations present an excellent case study. Intended to instruct, clarify, argue, define, or hypothesize, they are human creations made possible *by* technologies. In technical communication, we tend to conflate the various genres of visuals, confusing ourselves and students with the multiplicity of ways that a word like "illustration" can be interpreted. But we nevertheless attend to the pictorial in textbooks, journal articles, and other publications that theorize visual communication in technical and scientific fields. When the discussion comes around to scientific illustrations, they are frequently seen as tools of the technocracy—inveigling readers, through slick presentation, to accept spurious claims. Other times, they are considered to be fundamentally verbal rhetorical structures simply lacking words, but usually accompanied by words which they support.

My research into the production of illustrations in science, and my concern with the treatment of visual communication within the field of technical communication, have led me to propose that approaches to visuals in our discipline are directly parallel to Feenberg's theories of technology, and I recommend a critical theory of illustrations as an alternative to extant approaches to visual rhetoric which can be polarizing and unproductive. The critical theory of illustrations derives from part (though not all) of Feenberg's critical theory of technology.

Scientific illustrations have been characterized in technical communication largely as necessary evils, although a potential change in direction is evidenced in such works as technical communication researcher and theorist Lee Brasseur's *Visualizing Technical Information* [3]. Brasseur points out that in technical illustrations, perspectival conventions (those techniques which imitate personal viewing of three dimensional objects, in contrast to projections) tend to be interpreted as truthful, partly through the objectifying of the content. The most important contrast typically made between the image and the written text is the assertion that pictures present absolute claims and prose provides a more honest and thorough explanation through qualification, hedging, exceptions, and other devices [4]. To many visual theorists, the immediate response to such dichotomizing is that prose may be as unambiguously absolutist and misleading as the most egregious image, and a better understanding of the purpose of the image would cause it to be considered as, for example, a hypothesis rather than a claim of fact. Unfortunately, technical communication still seeks tools with which to approach images in order to get at their complexity, to responsibly complicate interpretations, in order to better understand the material at hand. Perhaps this is because we lack an underlying theory for conceptualizing visual communication, and thus, developing specific rhetorical strategies is premature.

Through the lens of Feenberg's critical theory of technology, investigating illustrations as technologies in and of themselves, and building on what's been

said about visual rhetoric in the technical communication literature, I propose that a facsimile of Feenberg's theoretical structure be used to reconsider visual representations in science. This is undertaken in a move toward a more sophisticated approach to visual literacy throughout the world of technical communication, in theory, practice, education, and research.

FEENBERG'S THREE MAJOR THEORETICAL POSITIONS

Writing is a technology, as are illustration and design of all varieties; the ease with which theories of technology map onto theories of writing and visual design should come as no surprise. Feenberg provides a useful triad of theories in *Critical Theory of Technology,* from which we can distill the major areas of theory underlying most of our approaches to teaching visual technical communication [2].

Instrumental Theory

Instrumentalism (akin to functionalism, positivism, essentialism, objectivism, or representationalism) entails the assumption that all technologies are mere tools, deployed by humans for various ends. Humans control the tools and their effects. Technologies themselves (tools, writing, pictures) have no inherent ideology and promote no particular value system in and of themselves, although they can be deployed ideologically.

Substantive Theory

Substantive theory (technological determinism) predicts that tools have effects on the world that can't be predicted based on the original intent. The results of the use of technologies (tools, writing, pictures) can never be controlled, and are often damaging to people. If a technology is made available, it will, inevitably, be exploited and will run its course. Social systems become the products rather than the masters of the technologies available to them. The only alternative to being controlled by our technology is hardly feasible: to eliminate the technologies and systems that rely on them.

Critical Theory

Critical theory posits that within existing social structures, using modern technology, a scenario is possible whereby humans control the technologies and deploy tools in positive ways, toward desirable ends. Although such an approach requires more explicit participation by a thoughtful citizen, critical theory avoids the fatalism of substantivists, while avoiding the naivete of instrumentalists. Critical theory acknowledges that both instrumentalism and sustantivism have

merits, but suggests that rather than abandoning technology, consciously and collectively reforming our utilization of technologies can change the ways that technologies are perceived and, more importantly, ultimately used. The problem is not that technology exists, but that in using technology, "we make many unwitting cultural choices" [2, p. 8].

APPLICATION OF CRITICAL THEORY TO VISUAL COMMUNICATION

The literature in technical communication is contradictory about many aspects of visual literacy. The most recent (10th) edition of Lannon's widely used textbook, *Technical Communication,* claims that "visuals serve as a universal language" [5, p. 291]. Transcending differences of language, culture, and ideology, such images are merely instruments, free from the cultural and ideological baggage of language. Perhaps out of necessity—it is, after all, not palatable to undergraduates to be more confused after reading the textbook than they were before—visuals tend to be downplayed in textbooks, especially such difficult types as scientific illustrations. Granted, textbooks are improving in their discussions of visual forms. Where previous editions of technical communication textbooks might suggest downloading decorative graphics after completing a writing task toward the goal of "document design," more textbooks are focusing on design as integral to the document production process. Indeed, the role of illustrators is beginning to be acknowledged. We see fewer suggestions that graphics be downloaded or hastily and inexpertly developed using available tools, and more discussions of the work of professional graphic artists. However, much of the treatment of visuals is still instrumentalist in underlying motivation.

Instrumentalist, substantive, and critical approaches to visuals are all depicted in the literature of technical communication scholars, sometimes being combined in single articles or arguments.

Instrumentalism was, for a long time, the default approach to visuals in technical communication, perhaps because of the verbal bias of most practitioners and academics in the field. Occasionally, instrumentalism emerges explicitly in self-conscious theoretical articles explaining how to design, use, or interpret visuals. Technical communication consultant William Horton expressly attempts to avoid suggesting that pictures are less culturally situated than prose, but then lists ways to universalize graphics: "disguise or diminish national differences, . . . hide audience-specific details, . . . use an icon, . . . obscure or omit textual labels" [6]. The claim is that a cleaned-up picture presented correctly and with the user in mind will communicate neutrally. Horton recommends usability testing for ensuring that a document's images serve the intended purpose. In keeping with instrumentalism, the suggestion is clearly that the tools and their effects are controllable.

Carlos Salinas addresses the problem, as he sees it, of instrumentalism being the dominant paradigm in technical visual communication theory and practice: "A functional view . . . stresses objectivity, ignores interpretation, and sees design as preset layout formulae" [7, p. 165]. The challenge of escaping instrumentalism, which tantalizes us with a simple, easy avoidance strategy for visual communication, is not being ignored, but is still an uphill battle.

Substantivism, when applied to illustrations, implies simultaneously that images constitute a reality and that images, being powerful and unwieldy, pose danger. One of the most interesting examples of substantivism is the critique of the BBC's *Walking with Dinosaurs* by social critic Andrew Darley [1]. *Walking with Dinosaurs* is a highly visual, hyper-realistic cinematic treatment of the Mesozoic era, 65 to 250 million years ago. Darley objects to the realistic depiction of dinosaurs in a cinematic genre that superimposes computer-generated prehistoric beasts onto the recognizable and trusted structure of the wildlife documentary. His argument ascends, at its pinnacle, to an attack on postmodernism and a valorization of modernism.

Substantivist arguments tend to rely on modernist sensibilities, for example, through a tone of skepticism about technology and avoidance of diversity and deviancy. Darley valorizes a modernist approach to science programming and its characteristically "narrative, linear, expository and didactic" presentation which explicitly demonstrates science as contingent and evolving, and which places the work of particular scientists in the foreground [1, p. 232]. Such programs honestly "acknowledge argument and disputation" [1, p. 237] among scientists. In contrast, the postmodern *Walking with Dinosaurs* film is motivated not by truth-seeking but by base capitalism [1, p. 238]. By conflating fictional animation with the wildlife documentary genre, *Walking with Dinosaurs* epitomizes postmodernism insofar as traditional boundaries are ignored or dissolved.

Also in keeping with postmodern themes, a contingent and continuously reconstructed reality is presented when filmmakers are able to script and invent the drama of the film, rather than merely present (even when editing and artificially enhancing) what happens in nature. The danger is in the "certitude" with which the plot unfolds in the postmodern presentation of *Walking with Dinosaurs* and the "conceit of producing an Attenborough-style treatment of dinosaurs" that is so spectacular, an audience may find itself believing truths that simply have not been established through the scientific orthodoxy [1, p. 245]. The danger, Darley contends, is that there is "no space" for discussion or contradiction to the claims exerted by *Walking with Dinosaurs* [1, p. 245]. A more verbal treatment, such as in the traditional program about paleontology, would, he claims, invite more critical thought.

A related concern of Darley's is that when the virtual replaces the real, people lose interest in their physical realities, in achieving a personal understanding of the truth, in validation through personal experience. They are misled as to

how science works because of their personal distance from the subject matter. Of course, it is difficult for the public to gain first-hand experience with paleontology, practically speaking. In partial compensation for the lack of empirical confirmation available to the viewer, the filmmakers list the scientists who were consulted in the making of the films. In so doing, according to Darley, these postmodern treatments of prehistoric cinema provide us with only irresponsible half-truths about the *extent* of the scientists' contributions to the cinematic product, and fool us into thinking that some legitimate sort of empirical confirmation has occurred by someone at some time in the development of the arguments embodied in the film. Science, says Darley, teeters on losing its credibility because of the conflation of fiction and fact found in representations of scientists in films like *Walking with Dinosaurs* and *Jurassic Park,* and the public has been bamboozled to the point of not even realizing what's happening.

Darley's substantivist argument contains many characteristics of technological determinism as Feenberg describes it in a broader approach toward technology, not just visuals. Yet when Feenberg discusses "this apocalyptic vision . . . often dismissed for attributing absurd, quasi-magical powers to technology" [2, p. 7] he could have been talking about the deterministic vision which is apocalyptic and does attribute mighty powers to visual communication.

Feenberg's answer to instrumentalism, which tends to ignore the effects of technology, and to substantivism, which tends toward paranoia about technology, is a critical theory. Just as instrumental and substantivist approaches to visual communication are common in our literature and tend to oversimplify or demonize the power of the visual, a critical theory of visual communication helps unravel the way the power of images is deployed and suggests how to harness it for humanistic ends. This parallels Feenberg's claim that a critical theory of technology requires the "invent[ion] of a politics of technological transformation" [2, p. 13]; to advocate for a critical theory of visual communication is to contribute to the development of a politics of visual literacy quite different from that most prevalent today.

Using scientific illustrations as a case in point, or a subset of visual communication, the tools for a critical approach can be recommended. The important argument, however, is that the critical theory-based approach should not regress, at any point, into an instrumental or substantive attitude toward visual artifacts. To be properly tested, critical theory requires a commitment to challenge the current approaches to illustrations and study them seriously. Rather than juxtapose the technological as being at odds with the humanistic or cultural, illustrations can be conceived of as cultural and technological artifacts, deployable for humanistic ends. The politics of transformation to which Feenberg refers can be seen playing out on several stages in technical communication: classrooms, research studies, theoretical literature, and workplaces. My concern here is with the first three of those settings.

CRITICAL APPROACH TO ILLUSTRATIONS IN THE CLASSROOM

A logical starting point, because of its concrete nature and familiarity, is the classroom. The classroom is the place where practitioners, researchers, and theorists are explicitly and implicitly trained to handle the complexities of visual communication. Common knowledge suggests that we teach as we are taught, and because most technical communication instructors have been exposed more to instrumental and/or substantive theories of visual communication, whether consciously or not, those belief systems are being propagated in educational settings.

To keep the discussion specific, I will consider as examples only scientific and technical illustrations—pictures intended to instruct, clarify, describe, argue, and/or define, as texts or parts of texts in professional or educational contexts. Pictures of dinosaurs in museums, then, make good examples here; dinosaur illustrations from pop culture, children's entertainment, or advertising do not (more for the sake of simplicity than the naïve assertion that learning occurs through didactic rhetoric and not popular culture).

Recall the contention that textbooks tend to advocate an instrumentalist view of visual communication. Following any number of textbooks will result in instrumentalist instruction. Yet other theoretical works that inform teaching and appear to be critical are also instrumental, a case in point being Edward Tufte. His thesis is that if information graphics are properly developed, with a complete understanding of the data and the relevant generic conventions, then such graphics can be produced correctly; otherwise they are flawed. Through his suggestion that graphics are vehicles for comprehension, he expresses instrumentalism. A statistician by training, Tufte sees quantification as a skill that can be mastered, and information graphics as tools for demonstrating or building arguments, for sharing or compiling information in a culturally neutral vacuum. "The design of statistical graphics is a universal matter—like mathematics—and is not tied to the unique features of a particular language," Tufte writes in *The Visual Display of Quantitative Information, 2nd Ed.* [8].

The first step in bringing critical visual literacy to the classroom is to expose students' underlying assumptions and judgments, to give them fresh eyes and the ability to reflect on their own preconceptions. Toward this end, students, either as a class or in small groups, can be asked to describe an important professional illustration that they haven't seen before (for example, I've used professionally illustrated museum murals from paleontology displays). Two lessons tend to emerge: the students lack a vocabulary for describing images, and they jump to evaluations and aesthetic commentary rather than describing. If students are assisted in developing the vocabulary to describe and interrogate images, they can begin to evaluate critically.

The vocabulary for description exists in the literature [9] and in several technical communication textbooks. Rebecca Burnett's *Technical Communication, 6th Edition,* for example, introduces and explicates terms including direction, contrast, balance, scale, rhythm, alignment, emphasis, gestalt, and proximity, in discussions of text analysis that treat design, words, and pictures as constituent elements of communicative artifacts [10].

Some textbooks elide the question of what to call the parts of documents except in a rudimentary fashion, and in such a case, supplementation from other material may be necessary. Such textbooks tend to be instrumentalist in their treatments of visual elements overall and are characterized by common features: discussing visual elements in chapters separated from the rest of the textbook; devoting more ink to teaching writing than design; and focusing on classification of images rather than rhetorical intents, effects, and ethics of images and design.

The question of whether students are able to describe illustrations before evaluating them is an important one. First, they must have the vocabulary for description. Examples of types of drawings, even the most basic distinctions such as cutaway, exploded view, and phantom view, give them a starting point for identifying the techniques used in the creation of the image. Illustrations are positioned on a page or screen, captioned or titled, signed or unsigned, and may be colorized. Illustrations are created by people, whether or not the human hand is apparent. History shows us that mechanical-looking drawings were created by the human hand long before tools made it possible for anyone to produce graphics on computers.

As students learn to name the elements in illustrations and closely observe how published illustrations are composed, they should be prompted to try their hand at creating an illustration. One classroom activity in drawing requires the instructor to present students with a concrete drawing: a line drawing, sketch, or outline (of an animal, for example), and tell them to try to draw it fully fleshed, with fur/hair, facial features and an expression, and some clues about habitat (ground for it to walk on, plants in the background). Students with little or no art background can be invited to try (as homework or an in-class activity) to draw first with crayons or colored pencils, and then move to a computer. If storyboarding principles are being used in other parts of the course, the hand-drawn sketch might be considered a story board for the computer-generated illustration. The extent of the activity may depend in part on the tools available for training the students—if Adobe Illustrator™ is available and the students can use a stylus and pad for creating a drawing, they will be more easily able to replicate their own handstrokes on the computer than they will likely achieve using a keyboard and the drawing tools in Microsoft Word™. On the computer, students should be encouraged to use the computerized effects such as shading, stippling, sampling and stamping, and cropping and resizing, to name a few.

Soon the differences between the tentative, undeveloped creations of the novice and the polished, finished, and effective illustrations of professionals will

be clearer to the students, especially if professional illustrations of similar subject matter are offered for viewing. Evaluation of illustrations may now move from subjective, under-theorized and idiosyncratic proclamations to a substantiated explanation about what the illustration does and how the effect is achieved.

A common result of such activities is a newfound respect for the work of illustrators. While the public perception tends to be that computer-generated artwork is easier to produce than artwork created with paint on canvas, in reality, illustration is a skill that takes years to develop. Professional illustrators control not only the technological tools at their disposal, but have a broad education about their subject matter, business acumen, and related skills that constitute the same profound rhetorical sophistication as writers. The idea of being able to download stock images for any detailed, original, technical, or scientific purpose, and the notion that anyone can quickly develop appropriate images without any training or practice, will be quickly dispelled. Part of critical visual literacy is recognition of original, well-designed, professional illustrations, and respect for their authors.

Indeed, a good outcome in visual literacy practice would be students' ability to generate a list of questions they would ask of the author/editor responsible for the publication in which the illustration appears. Questions about the intention, origin, medium, author, context, rhetorical appeals, and effect of the image or text would demonstrate that the illustration is being seen as a potential vehicle for meaning-making, a goal of critical visual literacy. If instrumentalism is the default theory underlying the instruction or discussion, the illustration may be denigrated by students as a mere decoration or visual version of a written text. If substantivist principles are at play in the classroom, the image may be cast as a potentially misleading overstatement of a hypothesis or an appeal to emotion. A critical approach to illustrations would help us remain aware that illustrations have a range of communicative purposes and effects, and may be unethical, dehumanizing, or misleading, but we would entertain multiple possibilities before arriving at a judgment about the nature of the image.

Clearly such activities that can build critical visual literacy take time—time that may be occupied by other course goals. Whether visual literacy-building activities are incorporated into various courses in a curriculum or concentrated into a design course or two, they may be useful for students who become citizens who make decisions about our cultural values and educational priorities. The push toward critical visual literacy need not wait until the college years, of course. The call for increased attention to visual literacy in grade school suggests the following strategies:

1. Instruction by teachers on the nature of illustration and how to observe and interpret the pictorial representation alone and in conjunction with the written word;
2. "Teachers need to spend time and effort talking through the meanings of the images . . ." with their students [11, p. 257].

3. Use of simple captions, set apart from the illustration by color or border, which would be aimed at attracting reader interest to encourage them to read and verify their preconceived notions regarding the visual representation [12, p. 36].

No recommendation is made, in too many articles calling for visual literacy, about how to achieve the instruction referred to in item 1 above, perhaps because the article was primarily summarizing a research study in visual literacy, a topic to which I will now turn.

CRITICAL APPROACH TO ILLUSTRATION FOR RESEARCHERS

A recent research study is prefaced by an abstract stating that "illustrations may not promote student understanding, but may, in fact, encourage misconceptions about science" [12, p. 23]. In the study, researchers asked elementary school students to name and describe pictures. The researchers note that "Care was taken not to prompt students to read the accompanying text or captions" [12, p. 26]. Because of the misidentification students made of "an iguana" (which was actually a chameleon) or a toad (a frog), the researchers concluded "many students fail to construct the intended meanings from the illustrations they view. Thus, illustrations may not foster an accurate understanding and may contribute to misunderstanding, alone or embedded within a text" [12, p. 35].

Knowing, as we do, how difficult it is for college students to describe illustrations, expecting young children to do so seems a bit of a stretch. To discourage the children from giving answers using the writing on the page, as the authors claim to have done, skews the results from the interviews. The researchers report that only two of the subjects chose to read the writing on the prompts; had they been instructed to do so, far more of the children would have read the text and answered in a way the researchers counted as correct. Children are often encouraged to use their imaginations instead of respond literally to visual and verbal prompts; this study takes such interpretive license and translates it into statistically significant misinformation.

The study, to the researchers' credit, ends with a wonderful call for visual literacy education: "the greater need is to educate students in visual literacy so that they have the ability to construct more accurate knowledge and understanding of written and illustrated concepts" [12, p. 36]. But the takeaway from the study was that illustrations are charlatans, deceiving students, distracting them from the truth in the words on the page, and demonstrating with statistical significance the danger of pictures.

Productive research directions are provided throughout Karen Schriver's *Dynamics in Document Design* [13]. The studies she summarizes are not always quantitative, but more significantly, they tend to inquire about why people do what

they do, rather than classify readings and interpretations as correct or incorrect. Schriver's examinations of research about position of images, for example, helps complicate, rather than simplify, understanding about the order in which readers scan parts of texts. Good research in visual communication, like good research elsewhere, relies on investigators asking honest questions and using appropriate methods to begin to answer those questions. Seeking confirmation of personally held beliefs about the nature of picture, visual literacy, or the superiority of one modality over another all lead to poorly-designed research studies.

Good research studies in visual literacy, then, achieve the following goals:

1. Avoid conceiving of images as either mere tools (instrumental) or dangerously misleading non-verbal cues (substantive)
2. Derive from a spirit of open-minded inquiry and knowledge-seeking
3. Avoid personal bias about the topic
4. Avoid overzealous quantification of complicated matters of interpretation, education, culture, and meaning
5. Provide specific details about the research methodology for the purpose of replication and informed derivation of research results for industrial purposes
6. Consider broadly the possible implications of the research.

Despite the existence of visual literacy research in the workplace, most of the research occurs in academic settings. Although this may isolate academic from workplace researchers, the latter—and practitioners—will benefit from well-executed research studies of visual literacy in academic settings if it is published and made available to them in the publications they read.

CRITICAL APPROACH TO ILLUSTRATIONS FOR THEORISTS

In theory building as in classroom teaching, knowing where our biases lie is extraordinarily useful; after all, there is no atheoretical teaching or writing but there is certainly instruction (and publication) without conscious understanding of one's motivations and values. Placing oneself on a spectrum of instrumentalism/substantivism/critical theory may be useful. I found myself attempting to find an example—any example—of a value-neutral image to include in my dissertation, and not being able to locate one demonstrated to me that I was on the far "critical" end of the spectrum. Feenberg's works, perhaps most especially *Critical Theory of Technology,* may help many technical rhetoricians understand the underlying motivations behind the more specifically-directed arguments in our discipline, although Feenberg does not specifically address visual theory and in fact, the parallel I draw between technology and illustrations becomes uneven when Feenberg's specific reasons and warrants are considered.

Building on the work of others is essential for creating a well-founded, unified body of knowledge about any theoretical enterprise. In technical communication, we might productively tie together several strands to weave a solid core of theoretical works from which to build a critical theory of illustrations.

Mary Hocks' "Toward a Visual Critical Electronic Literacy" [14] deals with electronic texts and samples a good selection of theorists and works. Design, hypertext, semiotics, critical literacy, rhetoric, and postmodern theories she uses are all relevant, and technical communication already draws on many of the relevant ideas, although not consistently.

Visual rhetoricians might well look into art theory ala Rudolf Arnheim [15], W. J. T. Mitchell [16] and any number of Roland Barthes's articles and books, for example, [17]. Gunther Kress [18, 19] provides good groundwork for theorizing visual communication. Sam Dragga and Dan Voss [20], Anne Wysocki [21], and Carlos Salinas [7] provide a range of examples weaving together theory and research responsibly and critically.

Some ideas for consideration by theorists involved with visual literacy, visual rhetoric, or visual communication follow:

1. Know where your biases lie, and develop your reasons for maintaining them
2. Attempt to compare your ideas to those of other scholars for the sake of weaving a virtual text rather than tossing an unconnected thread onto a pile of theory-related articles and books
3. Be conversant enough in various approaches to the topic to acknowledge what others would say, anticipating and addressing the antitheses
4. Consider how theoretical strands can be used in classrooms, translated to workplace practice, and considered ethically in a global context.

Feenberg's argument about critical theory is built from the texts of Ellul and Heidegger (on substantivism), Lukács and Marcuse, Marx, Foucault, and others. Delving backwards into the primary texts or early thinkers on a topic serves us well. However, in a field like technical communication, instructional technology, or information design, it's difficult to maintain currency in reading as well as a firm grasp of the classics. Books like Feenberg's help us lean on a summarization of theory toward development and implementation of best practices through research and reflexive pedagogy. Feenberg may not be a substitute for a firsthand reading of, for example, Foucault, but it's more efficient to read Feenberg than to read everyone he's based his ideas upon, especially if our goal is (as I think it should be) to better exploit the strong resources we have in theory building and move forward toward effective conceptualizations about topics of interest, as visual literacy so clearly is.

Generally speaking, Feenberg's recommendations for critical theory are valuable for technical communication because of the emphasis on democratizing knowledge. As Gerard Hauser points out in *Vernacular Voices* [22], the public sphere is an ephemeral but important site where cultural priorities wax and wane.

Technical communicators can take much responsibility in their classrooms and jobs, and in all our roles as citizens, to help people understand technical and scientific issues more clearly. Both Feenberg and Hauser agree that the more knowledge resides among small groups of specialists, the more disenfranchised the public may become, and the less positive action can be taken toward social change. Within technical communication, visual forms are an area where a gap exists between the expert knowledge of the artists, scientists, and engineers (specialists) who design and use the illustrations, and members of the public who see such illustrations in the accommodations [23] where we encounter technical and scientific topics. Increased visual literacy holds promise not for making members of the public specialists, but for training them to enter the conversation of the specialists by asking the right questions when considering technical matters. Public opinion is important in democratic societies, but when the public lacks the critical literacy to engage in meaningful discussion about topics, policy decisions are made with little public support and less public understanding, threatening long-term commitments to education, science, social welfare, and all other national programs requiring consensus, participation, and funding. Increasingly, images accompany the verbal arguments of importance to the public: genetic research, space exploration, and terrorism, to name a few. While our verbal literacy education evolves in helping students at all levels to unpack discourse, visual literacy lags behind. Making room for visual literacy in our curricula, using methods developed through research, and building and using solid underlying theoretical bases are clearly important goals for technical communication specialists.

REFERENCES

1. A. Darley, Simulating Natural History: *Walking with Dinosaurs* as Hyper-Real Edutainment, *Science as Culture, 12*:2, pp. 227-256, 2003.
2. A. Feenberg, *Critical Thinking of Technology,* Oxford University Press, New York, 1991.
3. L. E. Brasseur, *Visualizing Technical Information: A Cultural Critique,* Baywood, Amityville, New York, 2003.
4. J. A. Blair, The Rhetoric of Visual Arguments, in *Defining Visual Rhetorics,* C. Hill and M. Helmers (eds.), Lawrence Erlbaum, Mahwah, New Jersey, 2004.
5. J. M. Lannon, *Technical Communication* (10th Edition), Pearson Longman, New York, 2006.
6. W. Horton, The Almost Universal Language: Graphics for International Documents, *Technical Communication, 2*:4, pp. 682-693, 1993.
7. C. Salinas, Technical Rhetoricians and the Art of Configuring Images, *Technical Communication, 11*:2, pp. 165-184, 2002.
8. E. R. Tufte, *The Visual Display of Quantitative Information* (2nd Edition), Graphics Press, Cheshire, Connecticut, 2001.

9. T. C. Portewig, Making Sense of the Visual in Technical Communication: A Visual Literacy Approach to Pedagogy, *Journal of Technical Writing and Communication, 34*:1&2, pp. 31-42, 2004.
10. R. E. Burnett, *Technical Communication* (6th Edition), Thomson Wadsworth, Boston, Massachusetts, 2005.
11. F. Stylianidous, F. Ormerod, and J. Ogborn, Analysis of Science Textbook Pictures about Energy and Pupils' Readings of Them, *International Journal of Science Education, 24*:3, pp. 257-283, 2002.
12. J. K. Watkins, E. Miller, and D. Brubaker, The Role of the Visual Image: What are Students Really Learning from Pictorial Representations? *Journal of Visual Literacy, 24*:1, pp. 23-40, 2004.
13. K. A. Schriver, *Dynamics in Document Design: Creating Texts for Readers,* Wiley Computer Publishing, New York, 1997.
14. M. E. Hocks, Toward a Visual Critical Electronic Literacy, *Works and Days, 17 & 18,* pp. 157-172, 1999-2000.
15. R. Arnheim, *Art and Visual Perception: A Psychology of the Creative Eye,* University of California Press, Berkeley, California, 1954, 1974.
16. W. J. T. Mitchell, *Picture Theory: Essays on Verbal and Visual Representation,* University of Chicago Press, Chicago, Illinois, 1994.
17. R. Barthes, *Image Music Text,* S. Heath (trans.), Hill and Wang, New York, 1977.
18. G. Kress, Visual and Verbal Modes of Representation in Electronically Mediated Communication: The Potential of New Forms of Text, in *Page to Screen: Taking Literacy into the Electronic Age,* I. Snyder and M. Joyce (eds.), Routledge, London, pp. 53-79, 1998.
19. G. Kress, "English" at the Crossroads: Rethinking Curricula of Communication in the Context of the Turn to the Visual, in *Passions, Pedagogies and 21st Century Technologies,* G. Hawisher and C. Selfe (eds.), Utah State University Press, Logan, Utah, pp. 66-88, 1999.
20. S. Dragga and D. Voss, Cruel Pies: The Inhumanity of Technical Illustrations, *Technical Communication, 48*:3, pp. 265-274, 2001.
21. A. F. Wysocki, Seriously Visible, in *Eloquent Images: Word and Image in the Age of New Media,* M. E. Hocks and M. R. Kendrick (eds.), MIT Press, Cambridge, Massachusetts, pp. 37-59, 2003.
22. G. A. Hauser, *Vernacular Voices: The Rhetoric of Publics and Public Spheres,* University of South Carolina Press, Columbia, South Carolina, 1999.
23. J. Fahnestock, Accommodating Science: The Rhetorical Life of Scientific Facts, *Written Communication, 15*:2, pp. 330-350, 1998.

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