

Triangulating Communication Design: Emerging Models for Theory and Practice

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ABSTRACT

This paper describes the enduring dichotomy between what is defined as science and what is defined as non-science, and shows how this dichotomy serves as a backdrop for current divisions between theory and practice. The canonical concept of invention and contemporary interest in problem setting highlight the similarities between the activities of theoreticians and practitioners and inform the development of a useful definition of rhetorical or communication design. While recent developments in activity-, work-, and ecologically-centered design provide a powerful metaphor for contextualizing communication design work, a tentative argument is made for attending to emerging opportunities and challenges related to distributed space and time.

Categories and Subject Descriptors

H.5. [Information Interfaces and Presentation], H.5.2. [User Interfaces]: Training, help, and documentation.

General Terms

Design, Documentation, Human Factors, Theory.

Keywords

Communication, Design, Practice, Theory.

Engineering, like poetry, is an attempt to approach perfection. And engineers, like poets, are seldom completely satisfied with their creations [50, p. 83].

1. INTRODUCTION

If we define design as “the concrete interplay and interconnection of signs, things, actions, and thoughts” [10, p. 20] and communication as multimodal articulation, inquiry, interpretation, and argumentation framed by communities and contexts, we begin to get a sense of why multidisciplinary approaches to communication design are inevitable. The multidisciplinary domain of communication design requires both theory and practice. Indeed, Buchanan has observed that “... design, like rhetoric, was practiced as a craft and profession before it became

a subject of theoretical speculation” [12, p. 188]. The divide between theory and practice (and between science and non-science) cannot be underestimated.

1.1 Science versus Non-science

Discussions about one’s “worldview” — or less dramatically, methodological perspective — often describe either the difference between scientists and nonscientists (e.g., technicians, artists, the general public) or between scientists who practice quantitative or qualitative methods. Thus Gieryn’s [28] overview of the historical differences between scientists and mechanics (ie., inventors and engineers) provides an excellent starting point for ways that we can view *design* as the integration of theory (or argumentation) and practice (or construction). According to Gieryn, scientists can be distinguished from mechanics in the following ways:

1. Scientific inquiry is the fount of knowledge on which the technological progress of inventors and engineers depends.
2. Scientists acquire knowledge through systematic *experimentation* with nature; because mechanics and engineers rely on mere observation, trial-and-error, and common sense, they cannot explain their practical successes or failures.
3. Science is theoretical. Mechanics are not scientists because they do not go beyond observed facts to discover the *causal principles* that govern underlying *unseen processes*.
4. Scientists seek *discovery of facts* as ends in themselves; mechanics seek inventions to further personal profit.
5. Science need not justify its work by pointing to its technological applications, for science has nobler uses as a means of intellectual discipline and the epitome of human culture [pp. 786-787].

These propositions of course are false. This is somewhat surprising given the perception (or prejudice), promulgated by the mainstream media and accepted without much resistance by the general public, that *pure* science exists and that its methods inform our practice and policy in a unilateral way [59]. Two problems exist with this view of science. First, the relationship between nature (objective reality) and technological representations of nature (imitation) has become increasingly blurred and, so, the contrast between experimentation (highlighting control) and observation (highlighting viewer-object inseparability) has decreased. Second, it rests on the assumption that research feeds into practice in a unidirectional manner.

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Instead, theory always informs practice and practice, without theory, however rudimentary, is impossible. Of course replicability and “certainty” are only possible in laboratory settings (if at all) and most human activities are instead a perplexing balance of competing interests, values, desires, tradeoffs, and acts of supreme satisficing [6, 39, 40]. Communication, learning, technological development, design, and theory testing are therefore the most ill-structured of ill-structured problems and assuming a one-way transmission from theory to practice, or from practice to theory as some researchers have advocated [38], is naïve. Schön [56] blames our preference for theory over practice, or “Technical Rationality,” for our lack of interest in how humans perform tasks, noting that “the concept of ‘application’ leads to a view of professional knowledge as a hierarchy in which ‘general principles’ occupy the highest level and ‘concrete problem solving’ the lowest” [p. 24].

Jablokow [33] thus describes a scientific universe that differs significantly from Gieryn’s twenty-year old system when he writes, “There are new expectations for today’s scientists, and they are staggering: more solutions, to more complex and difficult problems, delivered at increasing speeds (with shorter and shorter timelines), and subject to increasing demands for higher accuracy with a decreasing tolerance for failure” [p. 533]. Similarly, Powell and Owen-Smith [52] unpack the historical conception of researcher, stating “The traditional view of the university researcher as a dedicated and disinterested, though passionate, searcher for truth is being replaced in the life sciences by a new model of the scientist-entrepreneur who balances university responsibilities and corporate activities in the development of new compounds and devices designed to improve human health and generate revenues for the investigator, the university, and investors” [p. 108].

So too, recently, has the “science” of communication design been increasingly held accountable in terms of how much or little it can help us improve design, instruction, and communication. As Czubaroff [20] reminds us, “The empiricist-instrumental-pragmatic concept of knowledge needs to be complemented with a social vision of knowledge — a vision rooted in the traditions of praxis, practical reason, and ancient civic wisdom” [p. 69]. And so must our pragmatic views of the relationship between information, communication, and technology be challenged by dynamic social interpretations that place knowledge making in context. The challenge of developing rich social descriptions of communication design, however, is in finding productive strategies for sharing what we learn about communication in a given context and under particular circumstances. Here, the powerful notion of generalizability is frequently evoked and finding creative ways to articulate how much or little particular findings are generalizable to alternative audiences, measures, situations, and environments promises to strengthen exchanges between researchers and practitioners. As King and Frost [36] maintain, “The pitfall is not in the belief that new knowledge can be applied productively; that belief has been amply justified. Rather, it is in the confidence that knowledge per se can readily transcend the inherently ambiguous nature of things as we find them in the world” [p. 21].

If we accept that theory and practice are inextricably bound as activities and that achieving persuasive generalizability depends on one’s audience and purpose, it becomes clear that the historical

fissure between science and non-science has been maintained by dated conceptions of scientist (or designer) as lone producer, communicating outcomes *after* the action has taken place, and accepting feedback for incorporation into the *next* published or manufactured artifact.

Bereiter [7], in contrast, offers a perspective towards *science as progressive discourse* that describes scientific activities as profoundly dialectical, contingent, and community-driven [cf., 51]. A view of science as progressive discourse stresses the importance of a *mutual understanding commitment*, an *empirical testability commitment*, an *expansion commitment*, and an *openness commitment*, commitments that all require “... some sacrifice of immediate self-interest” in order to contribute to arguments being forwarded at the given time. Scientific progressive discourse, according to Bereiter, requires

1. A commitment to work toward common understanding satisfactory to all.... It is to be distinguished from a willingness to compromise, which presumes that opposing sides will not alter their beliefs but that each side will yield just enough to achieve a practical resolution of conflicts.
2. A commitment to frame questions and propositions in ways that allow evidence to be brought to bear on them. What counts as evidence may itself be disputed; the commitment is to seek out things that opposing sides will accept as evidence and to frame the discourse in ways that build on such evidence....
3. A commitment to expand the body of collectively valid propositions.... A commitment to expand (in number, scope, or connectedness) ... the body of the collectively valid implies a willingness to maximize the basis from which new conclusions may be drawn, thus increasing the possibilities of an advance in understanding over the understandings originally brought into the discourse....
4. A commitment to allow any belief to be subjected to criticism if it will advance the discourse.... This challenge is not done willy-nilly, however, but is conducted in the course of trying to resolve some impasse or to achieve some higher goal.... [p. 7].

Rather than focusing on how our sense-experiences account for in-the-world realities (given the increasing number of simulated realities that currently make up our worlds), we might argue that Bereiter’s “empirical testability commitment” instead emphasizes learning through experimentation, introspection, and collaboration. This position, moreover, allows us to explore alternative data collection and analysis approaches. Van der Aalsvoort and Harinck [66] provide a concise historical overview of the strengths and weaknesses of alternative methods for studying social interaction. Their summary includes empirical methods, ethno-methodology approaches, linguistic methods, and multi-method pluralism. This latter “approach,” also referred to as the “paradigm of choices” [p. 8], finds its origins in the 1970s when researchers grew tired of defending the parameters of their particular research programs and began focusing on understanding the phenomenon at hand. Van der Aalsvoort and Harinck conclude by recommending that researchers study prolonged and persistent engagement, highlight their particular research context, collect data from multiple sources and informants, represent numerous participants for study, and

carefully consider issues of generalizability and sampling [pp. 18-19]. These recommendations ought to resonate with researchers from any research tradition and, indeed, as Harpine [30] suggests, “Syllogism, deductive logic, inductive logic, the argument from authority, empirical observation, and hypothesis testing are widespread in diverse human societies” [p. 355], so these research methods are not necessarily even owned by Western scientists and empirical researchers.

Of course achieving efficient versus fully satisfying solutions necessitates expediency in our community decision-making processes and, so, Bereiter adds that the commitments to science as progressive discourse do not hold for all forms of discourse. One exception is legislative discourse which, he notes, is altered because

Governments have to act, and this often means that legislators cannot talk on until they reach an understanding satisfactory to all. They have to resort to compromise or majority rule.... In science, however, the discourse process itself is always open to question, and methodological disputes are common [p. 7].

Bereiter’s observations provide a middle ground for the increased interest in alternative data-collection methods in the study of communication design, in addition to supporting an approach to communication design driven by pragmatism and pluralism versus a neo-positivist philosophy of science. Bereiter’s emphasis on science-as-discourse and Buchanan’s [10-12] conception of design as an exploration of “concrete integrations of knowledge that ... combine theory with practice for new productive purposes” to generate a “new liberal arts of technological culture” [10, p. 6] both draw on a unifying rhetorical tradition that addresses both theory and practice. In addition, both authors highlight the benefits of a developing a research agenda that balances theory and artifact development, exploration, evaluation, and the generation of useful and substantial heuristics for both researchers and practitioners.

1.2 Theory versus Practice

Theory and practice are as inevitable as trial-and-error, involving sometimes tightly- and sometimes loosely-coupled feedback from actions to ideas and back again. Unfortunately, in our race for easy solutions or satisfactory compromise, we are often guilty of relying on simple prescriptions, anecdotal experience, and personal guidelines or principles to inform our actions (hence my on-going discomfort with any “workshop” that promises to help me design, teach, learn, speak, write, or live more effectively, with greater ease, and especially *in less time*). With complex tasks, efficiency is often counterproductive if the ultimate goal is effectiveness. Or, put bluntly, we are wise not to hurriedly cross the street without first developing an elemental theory of how traffic direction works.

A more dramatic example of the position that theory needs practice for grounding (and even the word grounding betrays our tendency to view practice as *below* theory) can be found in Johnson-Laird’s [34] argument that “theory should be describable in the form of an *effective procedure*” [p. 6]. Card, Moran, and Newell [14] distinguish between theory-based and empirically-derived applied sciences, noting that developing common

frameworks allows researchers to both anticipate and describe phenomena meaningfully. Schön [56, 57] is not as computational in his review of the relationship between theory and practice, but he does lament the privileged position that theory generally holds over practice, setting *high* theory as the aspiration and in-the-trenches application as the necessary outcome.

Both theory and practice involve, in addition to problem solving, problem *setting*. Schön defines problem setting as “... a process in which interactively, we *name* the things to which we will attend and *frame* the context in which we will attend to them” [56, p. 40]. Importantly, the more contingent our tasks and activities, the more difficult the act of identifying the appropriate problem; as Schön asserts, “... when the ends are confused and conflicting, there is as yet no ‘problem’ to solve” [56, p. 41]. Problem setting, moreover, increases in complexity as the instability of our environment increases and strategic problem solvers know not to confuse their epistemological position with their representations of given phenomena.

Research and practice are often characterized as unrelated enterprises but the distinction is, at some levels, an arbitrary one given emerging qualitative approaches to data collection, the emphasis that many funding organizations place on the generation of applicable research by “scientist-entrepreneurs,” and the misconception that practice is not exactly what researchers do when they are engaged in academic research: after all, conceiving, organizing, planning, implementing, and managing research *is* a practice. Equipment, instrument validation, technological enhancements, visual models of scientific theories, and peer-reviewed research articles are the socially constructed artifacts (ie., products) of the practice of research. Indeed, academic researchers can even find research artifacts devoted to the study of knowledge-making and research activities themselves in journals such as *Knowledge in Society*, *Research in Higher Education*, and *Theory into Practice*.

But the theories that we are striving to build in the face of exponential technological developments are only one end of the continuum: new technologies are the other. We develop a theory of online discussion in a text-based environment and our theory is informed by inevitable comparisons between the social and gestural communication cues that inform face-to-face and not online interaction. Technologies appear that allow us to interact real-time via audiovideo conferencing and our theory requires modification, perhaps as significant as drawing on an entirely untapped research literature, for example, video- or film-production theories and processes. Most engaging conversations about research with colleagues from other disciplines, thus, tend to be guided by attempts to explicitly define the specifics of one’s terms and to make connections via questions such as “Is that similar to such-and-such a technology?” or “How are you defining x?” (where x is the construct being examined, built, or tested). Similar process descriptions for scientist-theoreticians and non-scientist-practitioners are required, processes that invite interactions that are exploratory, iterative, experimental, generative, and creative. Such processes can productively be developed within the framework of a rhetorical or communication design perspective.

2. INVENTING COMMUNICATION DESIGN

Distinctions between science and non-science are difficult to maintain when we focus on the mediating role that communication and technology play for both. Indeed, as definitions of communication broaden to include emerging genres or subgenres (e.g. chat discourse, interface interaction events, self-documenting program structures, etc.), it becomes increasingly useful to describe and interpret activities in science and technology as specialized discourse events that interact intensely with the public sphere. Communication, broadly conceived, involves numerous literacies that vary in value depending on particular social contexts, and that requires social access to physical artifacts, skills, social support, and content [68]. These literacies can be characterized roughly as *computer literacy* (also referred to as Internet, digital, network, and media literacy), *domain literacy* (ie., competency in particular subject matters, areas, or contents), *textual literacy* (ie., writing, speaking, listening, and arithmetic and elementary mathematical reasoning), and *visual literacy* (also referred to as media and information literacy and, increasingly, including scientific, technical, and data visualization capabilities) [43].

Design is what academic researchers do when they construct knowledge and contribute new studies and publications for dissemination via peer-reviewed academic research journals [55]. Design is what practitioners do when they conceive and craft technical solutions for instructional situations using a combination of general (ie., theoretical) knowledge and situational (ie., practical) knowledge. Design is what professional and technical communicators do when they explore and manipulate the capabilities of SGML editors and HTML applications for displaying usable online documentation. Indeed, design is what we expect successful user-reader-learners to do when we attempt to teach them to interpret, select, analyze, present, and creatively apply new knowledge to their prior understandings and novel problem situations.

Design is always constrained by our conceptions of audience, purpose, and situation (or exigency) and design solutions always represent themselves as trade-offs rather than as correct or incorrect answers. A rhetorical or communication design perspective can also honor both an empirical dimension (toward building *generalizable* theories of behavior) and an artistic dimension (toward building *particularized* knowledge that can be applied successfully to problems in various domains). Some researchers, however, hold that scientific and design approaches to problem solving are incompatible with one another. In his critique of purely scientific approaches to problem solving, Buchanan advocates the development of design theories that account for both the prescriptive and the normative dimension of complex problem solving. The essential tension for Buchanan is between neo-positivist knowledge building and design knowledge making:

... design is partly rational and cognitive, and partly irrational, emotive, intuitive, and noncognitive. It is rational to the extent that there is conscious understanding of the laws of nature; it is irrational to the extent that the sciences have not yet succeeded in revealing the laws of complex phenomena. Indeed, there is reason to believe that

design will always retain an irrational or intuitive component, because there are properties of materials and forms that possess aesthetic and spiritual appeal for which no scientific explanation seems possible [11, p. 50].

Invention is therefore central to scientific, technical, and communication design. Miller [44] suggests that our inability to approach problems creatively (ie., to invent) and, instead, to focus on issues of form and style, began with the historical division between science and rhetoric (or non-science):

The collapse of invention as a rhetorical canon is complementary to the rise of empirical science. If the subject matter of science (bits of reality, inartistic proofs) exists independently, the scientist's duty is but to observe clearly and transmit faithfully. The whole idea of invention is heresy to positivist science — science does not invent, it discovers. Form and style become techniques for increasingly accurate transmission of logical processes or of sensory observations; consequently, we teach recipes for the description of mechanism, the description of process, classification, the interpretation of data" [p. 614].

The actual practice of design, inversely, demands that we determine the best possible solution under the current circumstances and, more often than not, theoretical prescriptions have a difficult time meeting this demand. As Pea [48] reminds us, "... one central aspect of work in design is that it is very commonly posed, or at least thought about, in terms of *trade-offs*. A designed thing is, of course, but one choice among many possibilities that were considered, and even more possibilities that were never considered" [p. 73]. Design is wicked, messy, and inexact. Schön [57] characterizes the mess that we must confront as follows:

Designers put things together and bring new things into being, dealing in the process with many variables and constraints, some initially known and some discovered through designing.... Designers juggle variables, reconcile conflicting values, and maneuver around constraints — a process in which, although some design products may be superior to others, there are no unique right answers [p. 42].

2.1 Designs for Invention and Problem Setting

A rhetorical or communication design perspective, therefore, does not exclude the application of empirical methods to the problems at hand but rather views data collected within those frameworks in the context of theory and practice, that is, of understanding *and* of making. As Heidegger [32] eloquently points out, "... thinking itself is man's simplest, and for that reason hardest, handiwork, if it would be accomplished at its proper time" [p. 16]. Such a perspective, as well, allows us to balance the interests of communicators and learners by acknowledging the constructive nature of the technologies that we use to mediate and evaluate our mutual efforts and outcomes. Edelson [21] posits that, although empirical research and design research employ different forms of support, their arguments are aimed at accomplishing the same ends:

Traditional empirical methods gain their strength from statistical sampling. ... The strength of theories developed

through design research comes from their explanatory power and their grounding in specific experiences.... A design research theory is compelling to the extent that it is internally consistent and that it accounts for the issues raised during the design and evaluation process.

Finally, ... design research is not, in fact, incompatible with traditional outcome-based evaluations. If the nature of any theory is such that a minimum level of certainty is required before it should be applied, then the theory should be evaluated empirically before it is applied, whether the theory was developed through design research or otherwise [p. 118].

Design and empirical research, therefore, not need to be treated as though they are mutually exclusive enterprises if we adopt a rhetorical perspective towards inquiry and knowledge making that emphasizes the construction of good reasons or arguments for specific decision-making situations. Although Edelson is correct in asserting that designers can benefit from employing empirical methods in their design processes, Buchanan [11] and, especially Cross [19], hold that the indeterminacy of all design situations distinguishes design from empirical research: "... design problems ... are not the sort of problems or puzzles that provide all the necessary and sufficient information for their solution. Some of the relevant information can be found only by generating and testing solutions; some information, or 'missing ingredient,' has to be provided by the designer..." [19, p. 108]. Complex research problems, in general, require continuous testing and revision and a rhetorical design perspective therefore is particularly useful for its emphasis on trial-and-error between individuals and their environment as part of the inquiry process.

So, when we consider the challenge of "preparing workers with skills for the 21st Century," we are actually addressing aspects of the design process that are too often already established for traditional learners, that is, problem finding, problem setting, and communicating the results. Unfortunately, Perkins [49] notes that

Conventional education does virtually all problem selecting for students, deciding which problems are worth doing and, often, in what order. Then the assignments stop. And we are puzzled when students do not see opportunities in everyday life to apply what they have learned. Such a mishap is commonly called "lack of transfer." But this is something of a mis-diagnosis, because it fails to recognize that the students have never had a chance to learn the process we are hoping they will transfer — problem selection. The surprising thing is not that learners commonly miss "real-life" applications, but that from time to time students find some [p. 113].

Invention and problem setting require a sophisticated understanding of the audience or audiences experiencing the problem and conceptualizing its solution, the frequency and severity of challenges presented by the problem, the demands posed and the complexity involved in solving it, and the characteristics of the environment and artifacts that comprise the setting of the problem space. In all such situations, problem recognition must be followed at the most general level by the creative identification of potential courses of action and approaches for evaluating the success of those alternatives. Designers employ numerous strategies for generating alternative

interpretations, including selection, comparison, explanation, organization, annotation, representation, elaboration, and categorization. And, finally, communicating one's results — or constructing one's argument(s) — is far more complex than traditional grammatical, formatting, and tool-centered treatments (e.g., the proverbial equivalent of "write up the report") would suggest. Argumentation involves, not only elements of production such as choosing, evaluating, and creating, but also social exigency such as commitment, composition, coordination, and expression.

In addition to attending carefully to how the design of communication for science and technology can facilitate and give shape to problem finding, invention, and problem setting, communication design researchers and practitioners require a contemporary language for describing and sharing their situations. Such a conception can be found in existing and emerging discussions related to the basic communication triangle.

3. TRIANGULATING COMMUNICATION DESIGN

For effective communication to occur, the speaker or author must adopt the presentation and treatment of the message to those who will hear or read it. Not surprisingly, the principle of audience orientation and the goal of applying it to concrete information design situations is a complex proposition. We begin with Kinneavy [37] who represents communication events as a triangle organized around a "signal" and consisting of an Encoder, Decoder, and Reality [p. 61]. Kinneavy's communication triangle is notably grounded in transmissional terminology (of encoders and decoders) and is instructional in that it highlights the relationship between individuals and context and between messages and community. The encoder, or orator, framed by reality or a context for communicating, generates a message that, in turn, is understood and interpreted by a decoder, or audience, in context. Interestingly, this preliminary transmissional triangle enjoys considerable elaboration in recent research on activity- [23, 27], work- [31, 45, 63], and ecologically-centered design [4, 35, 46, 61] where a communication act consists of motivation driving the activity, goals for completion, actions, intentional goals, and routine actions. Thus work, applications, and artifacts are evaluated by how they support a range of human activities [8].

Indeed, numerous researchers have explored alternative methodological approaches, modeled after design rather than notions borrowed from de-contextualized science [10-12, 42, 58], such as cognitive design [54], design research [3, 16, 17], practice-based research [41], design experiments [9], sociocultural instructional design [29], and learner-centered design [47, 60]. Cole and Engeström [15] have produced what they call a "basic mediational triangle" that places medium or artifact at the top of the triangle, subject (rhetor-designer), and object (audience-user) at the bottom. And Gay and Hembrooke [27] elaborate on Cole and Engeström's basic mediational triangle producing a configuration that highlights the role of factors beyond a rhetor and an audience. Activity theory, here, is connected to human-computer interaction to represent "dynamic change, tool mediation, and social construction of meaning" in action (see Figure 1):

Mediating Artifact | Communication Tool

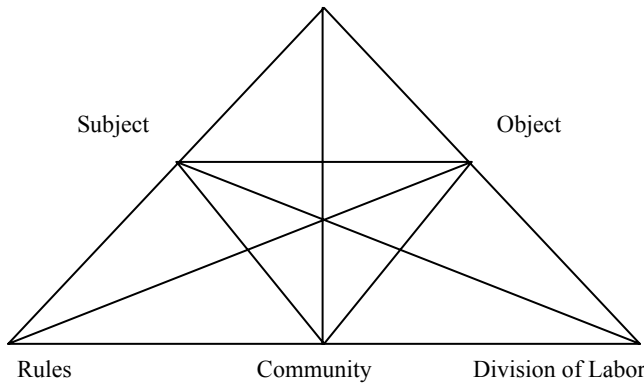


Figure 1: Application of Engeström's [23] activity analysis and Cole and Engeström's [15, p. 8] mediational triangle extended to communication [adapted from 27, p. 5]

In Gay and Hembrooke's triangle, we can see the advantages of viewing design situations as comprising of designers, users (ie., communities), tasks and activities, and artifacts and environments. Their addition of a third-tier set of influences focused primarily on the social dynamics of a given community process elevates design beyond the individual level [cf., 53]. One powerful advantage of viewing human design processes at the activity level is that one's perspective must shift from individuals and trial-and-error at the single task level and expand to emphasize inherently social issues such as conflicts, disagreements, "interactions, ambiguities, and complexities" [27, p. 16] among individuals and activities. This reorientation, in turn, allows for a view of design that includes construction, argumentation, and ongoing evaluation.

3.1 On the Relevance of Space and Time

Communication designers build interfaces (complex, multilayered networks of signals) within given contexts of use that are understood and interacted with by particular user communities. Importantly, the interfaces are no longer constrained by platform, space, or time, often inhabiting the anywhere and anytime global communication construct reserved for everything "24/7". Thus communication design is distributed geographically and temporally and becomes a placeless act of re-articulation, imitation, remediation, and pseudo-replication. In addition to requiring an understanding of circumstantial knowledge, verbal formulae, common sense, models of textual development, and logical norms [26, pp. 105-106], rhetorically-sensitive communication designers must also be polysynchronous multicomunicators or "presence allocators" [65, p. 47], able "... to understand how to make arguments, how to persuade, how to build trust and stable alliances, how to negotiate and bargain across boundaries" [62].

Tentatively, then, we can imagine modifying Gay and Hembrooke's mediational triangle to account for communication designs that occupy multiple spatial and temporal worlds [1, 3]. In these increasingly common contexts, durational versus perceptual time influences interaction, problem setting, and problem solving and communicators work in co-locational and distributed matrices shaped by networks versus nations. Generating a communication

design triangle that reflects our contemporary work, leisure, and learning lives is the long-term goal (see Figure 2):

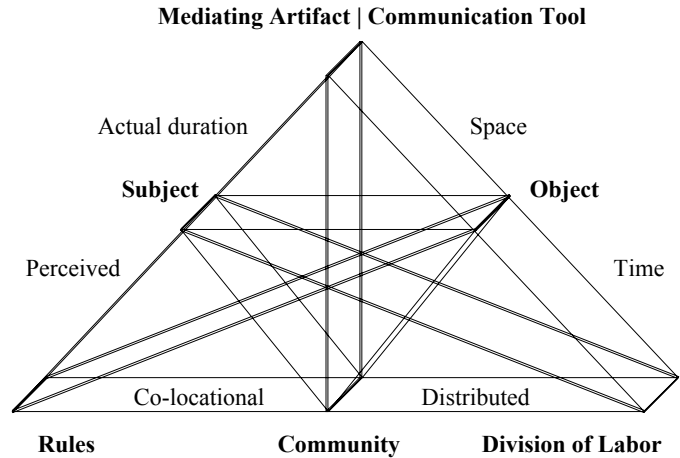


Figure 2: Communication design triangle augmented by distributed space and time [cf., 15, 23, 27]

4. CONCLUSIONS

In addition to outlining the problematic distinction between science and non-science, this paper describes how invention and problem setting can contribute to a definition of communication design that accommodates theoreticians and practitioners. Developments in activity-, work-, and ecologically-centered design provide us with rich opportunities to explore, describe, and analyze communication design in context. Notably, analogous conversations have played out in various disciplines, for example, in linguistics where the debate has been over syntactic versus semantic interpretations of language [24, 64], in computer science where the debate has been over information processing versus language-action and semiotic perspectives [67, 69], in graphic design where the debate has been over grammatical versus rhetorical analyses of images and words [13], and in psychology and cognitive science where the debate has been over cognitive versus social models of learning [2, 27].

In all of these debates, it is reductivist to conclude that semantic, language-rich, social models have won out but it is realistic to say that models that account for the historically competing interests between particularization and generalization, arts and sciences, and current-traditional and rhetorical perspectives seem a desirable cross-disciplinary theoretical goal. Indeed, these developments also allow us to tentatively begin exploring how communication design processes and products are influenced and challenged by the distribution of actual and perceived space and time.

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