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Epistemic Multiplicity in iSchools: Expanding Knowledge through Interdisciplinarity

La multiplicité épistémique dans les iSchools : Le développement des connaissances grâce à l'interdisciplinarité

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Abstract: Intellectual work that crosses disciplinary boundaries relies on effective communication for success. Since iSchools include faculty from a variety of disciplinary backgrounds, such effective communication is especially important for collaborative interaction. The growth of knowledge depends on potential strategies for sharing ideas, concepts, methods, vocabularies, and so on. This article suggests that semiotics may be the strategy that holds the most promise for success.

Keywords: interdisciplinarity, research, knowledge, semiotics

Résumé : Le travail intellectuel interdisciplinaire nécessite l'efficacité dans la communication pour atteindre des résultats satisfaisants. Comme les iSchools comptent des professeurs qui viennent de divers horizons disciplinaires, cette efficacité de communication est particulièrement importante pour la collaboration interactive. La croissance des connaissances dépend de stratégies potentielles de partage des idées, des concepts, des méthodes, des vocabulaires, etc. Cet article suggère que la sémiotique pourrait être la stratégie la plus prometteuse pour réussir.

Mots-clés : interdisciplinarité, recherche, connaissances, sémiotique

At present we are making do in our half-educated fashion, struggling to hear messages, obviously of great importance, as though listening to a foreign language in which one only knows a few words.

—C. P. Snow, *The Two Cultures*, 1959/1998

Introduction

What C. P. Snow had to say more than five decades ago is by no means outdated; scholars and intellectuals are still grappling with the problems. Library and information science (LIS), perhaps especially with the advent of iSchools, may be thought of as a centre of interdisciplinary activity. In many schools multiple degree programs exist, and faculty may have backgrounds in several fields. Does this render communication across the entirety of an iSchool or of a school housing an LIS program problematic? Perhaps more important, does this render knowledge problematic? How do scholars and researchers communicate, not merely the results of their work, but the concepts and ideas they employ to do that work? These are the fundamental questions addressed in this work. Individuals in disciplines with inherent differences face difficulties related to vocabulary, semantics, and sometimes even syntax. It may be that not all iSchools experience the interdisciplinary challenge, but for those that do the above questions are certainly likely to arise. It is almost always an objective of the scholars in these schools to use language that has optimal specificity, but the accomplishment of this is an open question. The question has been asked since Thomas Kuhn (1962) posed it more than 50 years ago (more will be said about Kuhn below). His claims hold that researchers, even within a single scientific sub-field (and this could include an iSchool), can face problems characterized by incommensurability. Kuhn's idea has been challenged over the years, but there are many who remain curious about the possibility of communicative variability. As Terence Horgan and Matjaž Potrč (2008, 135) remark, "One inquires about the language-**world** and thought-**world** relations from within a rhetorical framework that largely employs words and concepts that are vague" (emphasis in original). Their observation can apply to a field, or amalgamation of fields, that may include inherent communicative, epistemic, and ontological characteristics (such as iSchools).

Inter-disciplinary

In the above introduction, the word *interdisciplinary* was used deliberately. The *inter-* component implies that work is intentionally melded together by efforts to comprehend the knowledge bases, research methods, and language used in each of the sub-fields. By contrast, "multidisciplinary refers to a process whereby researchers in different disciplines work independently or sequentially, each from his or her own discipline-specific perspective" (Stokols et al. 2003, S24). As Sharp and colleagues (2011, 503) observe, "Interdisciplinarity is achieved when two frames are brought together . . . [T]he development of a new integrated frame constitutes *real* interdisciplinary research" (emphasis in original). Sharp et al. do not mention it, but the concept of frames originated with Erving Goffman (1974). Frames, according to Goffman, are perspectives that help to organize experiences, ideas, and work for individuals and/or groups. A discipline or sub-discipline may have an agreed-upon, or working, set of conceptualizations that help give shape to questions, methodologies, and values. As we will see, *frame* is not dissimilar to a definition of *paradigm* suggested by Kuhn. For the

purposes of this investigation, and for the aforementioned reasons, *interdisciplinary* is the term that will be employed. There is even further rationale for using *interdisciplinary*. Latour (2013) argues that a goal for science (writ large) is the production/discovery of *reliable* knowledge by acknowledging the natural existence of a plurality of modes of existence (see below).

For interdisciplinary work to have efficacy, meaning is an essential element of the work in which people engage. *Meaning*, according to the usage here, can have an ontological foundation but not in the same way that a tree or a mountain does. Among other things, tradition can affect the interpretation of meaning. Ricœur (2006, 13) makes a statement that is of extreme importance to this discussion: “Men [*sic*] speak different languages, but they can learn others besides their native language.” There is an ontological as well as a linguistic turn to his statement; to learn someone else’s language is more than competence with grammar and syntax. It is an ability to comprehend the “being” of things, the existence of items and items within contexts. The contextual matter is of great importance to this investigation.

What constitutes meaning (or, perhaps more accurately, what is taken to form meaning for individuals) is not determinate. That is, meaning, for individuals, is not fixed a priori, since diction, grammar, and linguistic pragmatics can lead to alternative interpretations. The alternatives can be incidental inasmuch as individuals may exhibit lexical preferences that shape ultimate interpretations, and the interpretations can differ from person to person. Wittgenstein (1958, 128e, no. 432) asks an important question that has pertinence for the consideration of multidisciplinary communication: “Every sign *by itself* seems dead. *What* gives it life?—In use it is *alive*[.] Is life breathed into it there?—Or is the *use* its life?” (emphasis in original). Wittgenstein stresses the pragmatics of communication; context is of essential importance to understanding. Individuals from different disciplines face the challenge of different uses and different contexts, as noted above. A political scientist and a chemist might have some communicative challenges that would have to be overcome if they were to collaborate on a project.

Understanding interdisciplinarity requires familiarity with disciplines and the work that takes place within them. Repko (2012, 4) provides what may be the most concise description:

Academic disciplines are scholarly communities that specify which phenomena to study, advance certain central concepts and organizing theories, embrace certain methods of investigation, provide forums for sharing research and insights, and offer career paths for scholars . . . Each discipline has its own defining elements—phenomena, assumptions, epistemology, concepts, theories, and methods—that distinguish it from other disciplines.

Repko’s description clarifies some of the challenges, perhaps particularly communicative challenges, for interdisciplinary work. The elements must be comprehended by all participants, and, as Repko adds, these can become contested spaces. As he sums up, the questions/problems that are at the centre of

investigation are the defining aspects of the research; the elements of the disciplines are means to the end of uncovering fruitful and edifying answers. He summarizes the components of *interdisciplinary* work thus (2012, 8):

- The contested space between disciplines
- The action taken on disciplinary insights, called integration
- The result of integration that constitutes a cognitive advancement called a more comprehensive understanding

Integration may be the most essential component of this definition. Boix Mansilla and Gardner (2003) assert that integration entails blending knowledge from multiple disciplines to result in a new understanding of an existing problem. It is integration that signals the dynamic from which iSchools can most profitably benefit.

Becoming interdisciplinary

This discussion is by no means an instruction manual for collaboration. It is not unusual to find advice aimed at organizational and policy-based measures that may assist interdisciplinary research (see, for example, Sá 2008). There are, of course, other dimensions of human behaviour to consider. Campbell (2005, 576), adopting a somewhat different (but related) definition of *interdisciplinary*, points out:

Interdisciplinary research is a group activity and as such is underlain by power. There are bound to be power differentials between members of a group. Individuals in a research team are unlikely to be at exactly the same stage of their careers, and someone is usually identified as a project leader. But power differentials need to be acknowledged, minimized, and managed or they can undermine interdisciplinary collaborations.

These are real concerns, but they omit a fundamental challenge of communication. Do the researchers from different disciplines speak different languages; is there an ineluctable incommensurability that might present obstacles to understanding? Do they *desire* communication with one another? Do obstacles such as ideology get in the way? How do the obstacles arise, and how can they be overcome?

It must be accepted that researchers from different disciplines bring heterogeneous languages and thought to the table of inquiry. There will inevitably be technical language that can present (at least) two problems: (1) some words or terms may be unique to specific disciplines and are not present in the lexicons of other fields, or (2) words or terms have specially designated meanings in some disciplines that do not occur in others. In either event there can be effective barriers, as members of one discipline may seek other ways of expressing concepts that are clearly known to them by certain words or terms. To couch the above assertion in slightly different ways, if this is a radical heterogeneity, understanding may be nearly impossible. If there is complex heterogeneity (which implies not only awareness of the heterogeneity but tactics to overcome it), understanding is well within the realm of possibility. To discuss a claim that understanding

is possible under any circumstances, the relation of language to cognition must be considered.

The section heading here is a bit misleading; people do not simply *become* interdisciplinary. Considerable effort is required for mutual understanding to occur. Again, Wittgenstein (1958, 152e, no. 574) provides some assistance here: “A proposition, and hence in another sense a thought, can be the ‘expression’ of belief, hope, expectation, etc. But believing is not thinking. (A grammatical remark.) The concepts. of believing, expecting, hoping are less distantly related to one another than they are to the concept of thinking.” His claim requires a bit of explication. Beliefs, hopes, and the like share some properties that are not conceptual in nature. To hold a concept or an idea in one’s mind requires some particular cognitive and, more important, linguistic elements. Those elements help to define terms and to place the ideas together contextually (this notion arises again). To use an example, consider the variety of usages and meanings that an idea such as *theory* may have across the many disciplines. To a physicist the word may signify description, explanation, and prediction. To a literary scholar the word could signify modes of interpretation, including nuances of structure, derivation, indebtedness, temporality, and other aspects. There is also the ordinary discursive use of the word *theory*, which is derived from the Latin for “speculation.” It must be emphasized here that the mutual understanding of a concept like theory by members of disparate disciplines is not impossible, but it is not automatic and, one might say, is not “natural” (in the sense that the natural languages of the disciplines are sufficiently distinct that the meanings do not immediately occur to the members of the various disciplines). Some words are polysemous; they may have several legitimate meanings, but each meaning may be limited to particular settings or usages. *Theory* is merely one example.

While language and communication are extremely important—even vital—to successful interdisciplinary research, there are additional considerations. Language, especially the operational language used in a discipline and by its practitioners, is reflective of other qualities (or frames). These qualities can be elusive; in fact, the first task for researchers is to gain awareness—and then understanding—of the qualities. A warning offered by Lélé and Norgaard (2005, 967) is appropriate:

Many . . . decide that it takes too much effort to communicate and share knowledge within such a disparate [interdisciplinary] group, and happily retreat to their own special fields, where all the participants use the same models of analysis, are comfortable with the assumptions they share as a group, and consequently “know” the same things.

Successful interdisciplinary collaboration frequently requires some *discomfort*; participants have to be willing to engage in epistemologically challenging assumptions and questions. *To know* is a presumption that has to be subject to some uncertainty and scepticism so that growth can occur.

Lélé and Norgaard (2005, 968) identify four families of obstacles that must be overcome if research is to be fruitful: the choice of problems and questions to address, differing theories and explanatory models, unique epistemological and

methodological stances, and societal interaction with and organization of disciplinary discourse. The obstacles represent values that inhere in the work and thought of each discipline and its practitioners. What they refer to as barriers carry the closest relationship to Kuhnian paradigms:

On the one hand, [paradigm] stands for the entire constellation of beliefs, values, techniques, and so on shared by the members of a given community. On the other, it denotes one sort of element in that constellation, the concrete puzzle-solutions which, employed as models or examples, can replace explicit rules as a basis for the solution of the remaining puzzles of normal science. (Kuhn 1970, 175)

The beliefs and puzzles Kuhn speaks of are firmly rooted in the revolutionary community.

Any commitment to interdisciplinarity must include a sceptical attitude toward what one once held closely as part of the work internal to a single discipline. The second obstacle is adherence to sets of theories and models used to examine phenomena that those in other disciplines also examine. Given that the social sciences, by and large, study human action, this second obstacle can be one that requires considerable effort to overcome. The third obstacle is the stubborn grasp researchers may have on epistemic backgrounds, ideas of what is known that shape how new knowledge can be constructed. At its worst, the third obstacle can lead to minds that are closed to variant epistemic presuppositions. The fourth obstacle is a social one and is deeply rooted in the academy. While *discipline* may connote breadth and boundary crossing, academic departments continue to exist. The very structure of iSchools may entail the reorganization of existing departments into a new bureaucratic unit—disciplines whose homes were distinct are now placed together in one organizational department, school, or college. Even the geography of a campus may require that the faculty of a large iSchool be dispersed into several different buildings (Lélé and Norgaard 2005, 968).

Our task in this article is to suggest a foundation for a new conception for knowledge systems design. One thing must be noted at the outset of the suggested system design. This is not an exercise in the formulation of logical relations. The reason for this is that logic does not allow ambiguity, variability, vagueness, or confusion. Sentences (or utterances in general) do allow these conditions, whether one likes it or not. Information may be incomplete; sentences can include contradictions; speakers may not grasp semantics, grammar, or syntax; or other interferences may occur. An example of a problematic sentence is “The planned attack on the city resulted in unforeseen collateral damage.” The sentence is grammatically correct, but the meaning is elusive.

The proposed structure is founded on principles of semiotics, the study of signs. There are a variety of ways to express the basic means by which sign systems operate. Semiosis can be defined as “the processes and effects of the production and reproduction, reception and circulation of meaning in all forms, used by all kinds of agent of communication” (Hodge and Kress 1988, 261). The connection between signs and information is clearly one that extends

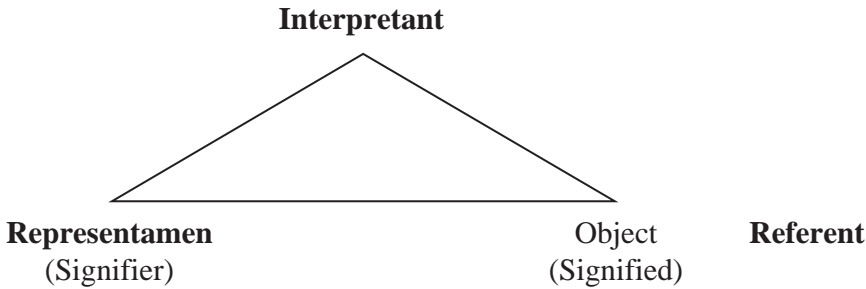


Figure 1: Example of a sign structure

beyond the act of reading (see Warner 1990). Above is an example of C. S. Peirce's (1958) and Ferdinand de Saussure's (1916) core conceptions of the fundamentals of semiotic elements (see Figure 1).

According to Umberto Eco (1976), labour is required to ensure the understandability of utterances if communication is to be successful. A speaker/writer has to labour to select the appropriate sign-vehicles that will produce desired or intended interpretations. The hearer/reader exerts labour in the act of interpreting. "Either to send or to receive these messages (or texts) requires that the sender should foresee, and the addressee isolate, a complex network of *presuppositions* and of possible inferential *consequences*" (Eco 1976, 152). If these conditions are not met, systemic communication is subject to failure. The model can be applied to the above example.

We can posit a hypothetical example that could fit into interdisciplinary work among faculty in an iSchool where interdisciplinary work is growing and developing. Problems of information-seeking are frequently a focus that draws the attention of individuals from disparate fields. A traditional LIS scholar, someone with a cognitive science background, and a third faculty member from engineering may decide to approach the question of how an information-seeker may go about the task of querying a body of content. The LIS researcher might begin with a knowledge base of addressing such a question on the basis of content analysis, making decisions on the basis of terminological semblance between the query and the retrieved content. The cognitive scientist may examine the seeker's foundational knowledge and want to carry out research into that seeker's mode of thinking. The engineer could lean toward task analysis, desiring to investigate whether the seeker's procedures match the design of the database architecture and structure. (N.B.: This is genuinely hypothetical; the three researchers may not adopt these starting positions.) Each of the faculty members operate from separate and distinct paradigms that may not be shared by the others. As long as the paradigmatic beginnings remain tacit (see Polanyi 1966), there is little probability that the researchers will have any sort of shared "cultural competence." The presumptions and epistemic bases will have to become explicit so that all three

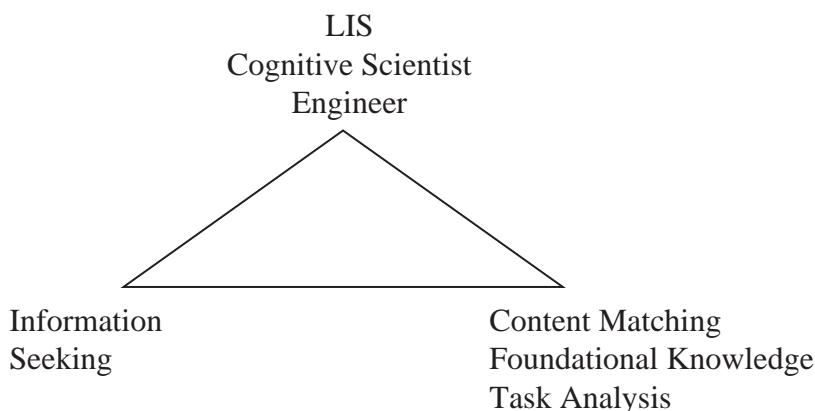


Figure 2: Application of the sign system to interdisciplinary work

will be able to comprehend and evaluate them. Communication is the first step, but it must lead to understanding. [Figure 2](#) illustrates the dynamic.

What is required for success for the separate and joint studies? The essence of the answer is that students, scholars, and researchers from many fields need to be able to communicate effectively (witness the above example). While there has been some degree of success with past systems, there remains the need for a mechanism that captures the linguistic and cognitive complexity of work that has some common terminology but not necessarily meaning. That is, there may be vocabularies that are superficially similar but are semantically and pragmatically distinct. The *theory* example is mentioned above; the word *culture* could also create difficulties in both social sciences and humanities disciplines. Information studies researchers with, say, separate philosophical and anthropological bents may find themselves speaking at cross purposes until and unless they engage in a structured effort to reach mutual understanding. One might envision culture as a shared cognitive, epistemological, or ontological world-view, while the other may consider traditions, family and group relations, or territorial considerations. The kinds of structures that may possibly help resolve such dilemmas will be discussed below.

One of the most completely developed analyses of semiotics in LIS is that offered by [Brier \(2010\)](#). It is not possible to provide a full summary of his extensive examination here, but some aspects should be mentioned. [Brier \(2010, 5\)](#) sets as his task two related intended consequences:

The first deals with the problem of how to conceptualize cognition and communication in a way that is compatible with the conceptual framework of both the sciences and the phenomenological aspects of psychology and the social science theories of meaning and communication . . . Second, I want to describe some practical consequences for library and information science (LIS), with a focus on the problems of indexing electronic scientific documents for subject searching based on the semantic interpretation of texts.

The phenomenological element is particularly important to the present investigation of interdisciplinary collaboration, especially given the intentional conceptual and practical purposes the researchers embrace. Each individual has a developed means by which understanding occurs through semantic and pragmatic tactics; those tactics are not necessarily shared among the agents in the interdisciplinary work. Sharing, as Brier (2010, 111–13) indicates, can become explicit as the existential world-view and the perceptions of each agent become evident through extensive language game action. While language games are frequently seen as barriers to open communication, awareness that they are inherent components of disciplinary understanding can help dissolve linguistic and, thus, phenomenological obstacles. The advice of Merleau-Ponty (1961) regarding perception and its sharing is well fitted to Brier's semiotics.

For a scenario like the one painted above (and for a resolution to be reached), a vital assumption must be made: one person is able to develop a reasonably clear conception of what another person's beliefs (here used in Kuhn's [1970] idea of the set of beliefs that define normal science) actually are. One manner of assessment is coherence; the stated beliefs of one of the researchers must fit completely within the system of beliefs held by that person. If that standpoint is accepted, the communicative task must undertake evaluation, not only of the one researcher's belief system and its coherence, but of the coherence of the belief systems (and contents) held by *both* of the actors. If the systems are consistent—or if there can be a translational process that can result in mutual understanding—there could be agreement on ontologically necessary elements (see, for example, Lehrer 1990, 13–14). A much more stringent theoretical and practical stance is correspondence (as is mentioned above). The idea is straightforward: ideas and language should correspond to the way the world actually is. Beliefs that are consistent between two (or more) people are possible if the experiences of the two are such that perceptions and ideas about the world are essentially the same. The force of ontology is clear in this conception (see McGinn 1999, 194–99).

The foregoing is a more precise state of the challenge faced by the design of interdisciplinary research projects. This article suggests that semiotics can provide a foundation for future design work. Sign systems depend on fundamental relations among the various components. The relationships may be open, but they have particular characteristics that demand specificity on the part of users of language. Saussure provides an extremely useful distinction that should be employed in design. The code that allows the realization of use is referred to as *langue* (to be distinguished from the totality of linguists' concern, language). *Langue* is used to enable individual instantiations of utterances, *parole*. To translate into semiotic praxis, there exists a signifier, a "stand-for" (Sless 1986, 5); the signifier is the "referring" mechanism in the triadic figure in Figure 1. As Eco (1976, 15) notes, the "standing-for" is always mediated by an interpretant. The *interpretant* (distinguished from *interpreter*) is the sense that can be made of a sign. Here, the signifier can have multiple signifieds. A system should attempt to account for as many possible signifieds as it can, and do so contextually (linking the signified to the signifier by means of the interpretant). In the example of

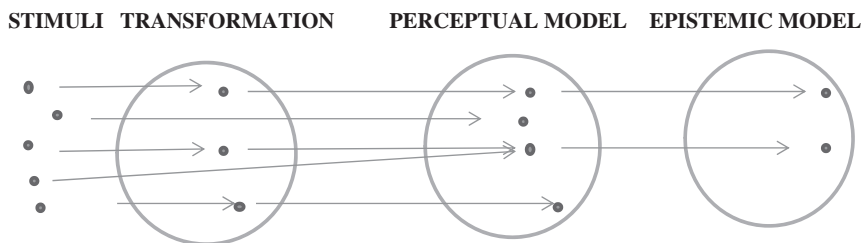


Figure 3: Movement toward knowledge formation

theory it is necessary to gain knowledge of the various meanings of the word across disciplines and to complete the triadic relationship by including the variability of interpretants.

The design of an effective cross-disciplinary information system can benefit from the employment of sign theory. Figure 3 provides a diagram that can be employed to account for variables in the communication process (that are sensitive to the needs of interpretation by explicating different referents; Eco 1976, 255). The figure illustrates how the perceiver responds to stimuli, usually *parole*, by sometimes proceeding from a stimulus throughout processes en route to the development of a semantic. Sometimes, however, a perceiver stops at the perceptual model. The system, to be effective, should guide the perceiver through the perceptual model all the way to the semantic. By so doing, the meaning of cross-disciplinary signs can be interpreted in full. Moreover, the referents can now be comprehended even when individual signifieds are distinct from one another. Ultimately, understanding can be communicated in interdisciplinary environments.

In order for interdisciplinary work to be effective, some intervening informational structures are needed. The intention of the structures and their use is to enable and enhance the likelihood of being understood. For example, problems must be categorized so that others can comprehend them; are there existing categorical schemata that are shared widely enough to avoid incommensurability? Should classification be a first task; is it a first principle? Suppose the scholars mentioned above decide to work together and to communicate a deeper understanding of an extremely complex phenomenon from the past. What is the first task they face? The following needs to be consistent with the foregoing. The historian may tend to classify knowledge according to human action—beliefs, family relations, social hierarchy, economic stability, and so forth. The epidemiologist may classify according to microorganisms, their carriers, manifestations of symptoms, rapidity of morbidity, and the nature of the spread of the disease, among other things. On the face of it, the classifications seem incongruous and of little communicative assistance—that is, if expanded semiotic modelling is considered to be separate from classification (which it is *not*). An expanded version of Peirce's design adds some detail to the simplified figure and demonstrates

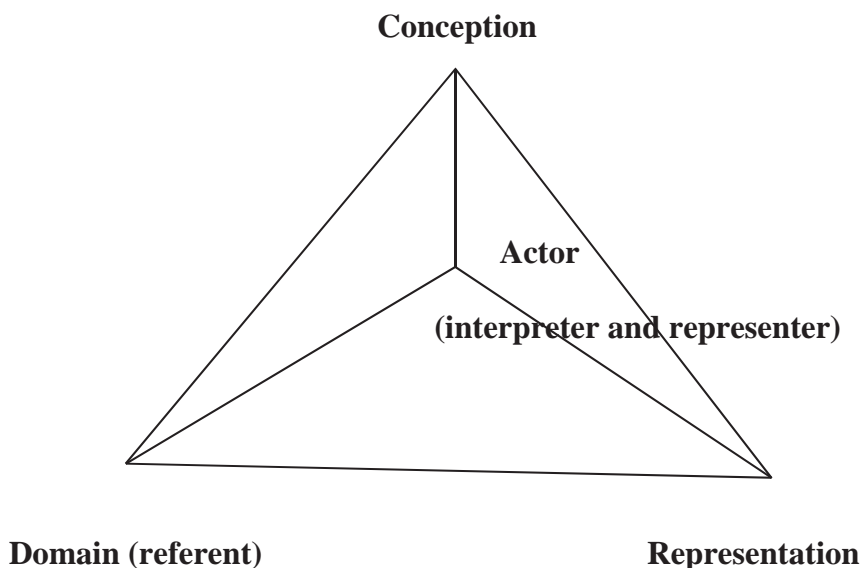


Figure 4: Signs and interpretation

how a semiotic model can both represent and suggest classificatory schemes that individuals from different disciplines might employ for their collaborative purposes.

While Figure 4 enhances our understanding of the communicative action that can (and does) take place in the course of interdisciplinary work, there are some elements that are not adequately illustrated. Figure 5 adds, among other things, distinctions between destination and designation, plus the possible corrupting influence of noise (which can enter at any point or area in the communication process). If noise does occur, the intention of understanding and progress can be interrupted. Noise is not limited to a literal manifestation; an occurrence of differing uses of technical language can lead to misunderstanding. The awareness of the dynamics that are represented in Figure 5 (and the other figures) can facilitate the kinds of communication and understanding that are essential to interdisciplinary research.

Figure 5 also demonstrates that when most communicative factors are taken into consideration, even more semiotic complexity enters the picture. Some of the elements require some explication. While source, channel, message, and destination should be familiar, some of the newly added features, such as the code, build on what has been mentioned above. Every discipline communicates according to a special language that is, to varying degrees, unique to that discipline. Bio-medicine, for example, uses a code designed to identify parts of the body, specific invaders of bodies (bacteria, viruses), symptoms, diagnoses, and prognoses. This code is not likely to be common to many other disciplines, even metaphorically.

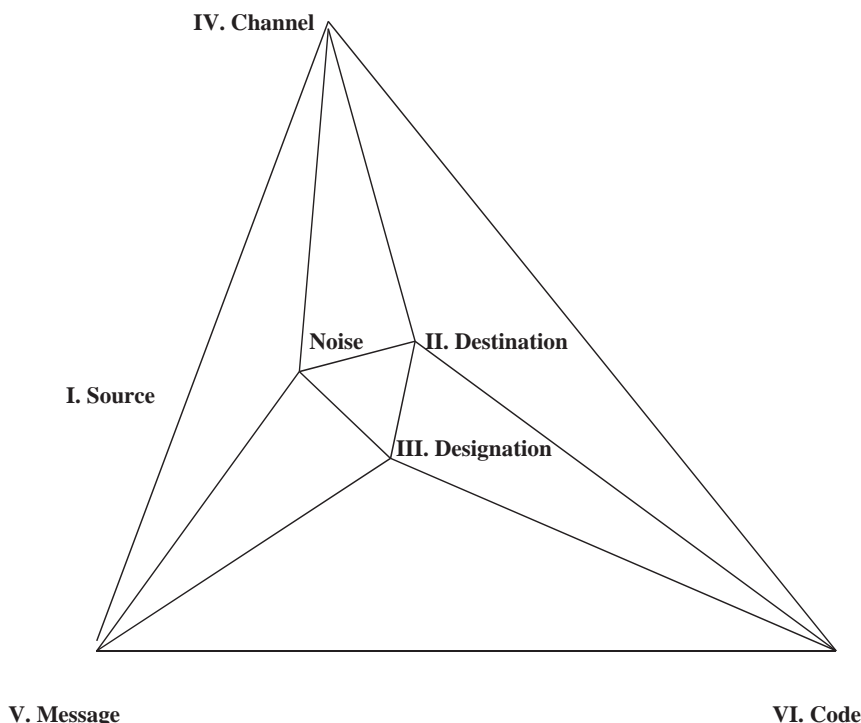


Figure 5: Communication model

If one of the collaborators works in, for example, medical informatics, that language will be part and parcel of the inquiry in which the individual is engaged. For this reason, the feature of designation is needed, so that the aspects of a code can be translatable and comprehensible to others outside the field. Terms and words and their particular designations enter the scheme and are integral to effective communication. This model also accounts for the bane of existence for those hoping to share ideas directed toward collaboration—noise. Noise is multifarious; it can signal a failure with respect to designation; it can alert participants to a breakdown of a channel of communication; it can indicate problematic use of codes; or it can be literal noise (such as interfering conversation or directions from those outside the scheme).

If dysfunction arises, the above concept can also indicate the constitution of the more political notion of communication, influenced by contexts that can be at odds. While the linguistic element employed ought to be pragmatics (what is meant when a speaker says something), there can be hidden intentions. For example, a medical professional may articulate a diagnosis that is intended to be clear and easily understood (and may well be shared within the medical community), but an insurance case worker might categorize the diagnosis in different language. Perhaps there is a difference between the two actors regarding the

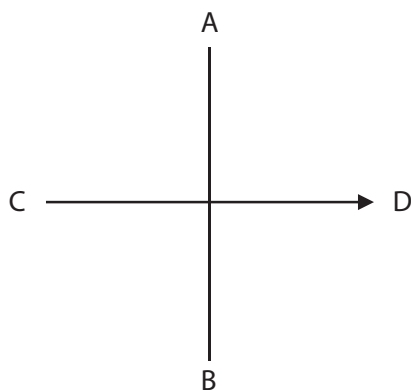


Figure 6: Saussure's model

treatment of the patient, but there may be a profound effect on the patient's insurance coverage and the medical professional's payment. The disconnect need not occur; the linguistic elements are not likely to be the major obstacles to shared meaning. Recanatì (2011, 32) offers the analysis that there are many components of dialogue that are marked by *standing meaning*, words or terms that are in common use and have accepted semantic meanings. The disciplinary parts of the dialogue can be called *occasion meaning*, or the vocabulary that is usually employed by members of one discipline or another.

The sharing of meaning (based, as it is, in individual—or disciplinary—meaning), as is suggested above, can be enhanced by the categorization of concepts. Since categorizations have inherent relationships, the discovery of relations assists people from different backgrounds with connection-building linguistic activities. In particular, linguistic pragmatics can present clues as to how sharing can occur. Most classification structures are incompletely contextual (not non-contextual but constructed in ways that are not entirely pragmatic). In a semiotic system any given signifier may have numerous potential signifieds, which renders interpretation difficult. Figure 6 draws on Saussure.

AB represents the axis of simultaneities, and it manifests the relations of co-existing things. The intervention of time is excluded from this axis of reality. CD represents the axis of successions. Along this axis of reality only one thing at a time can be considered, but it is the axis on “which are located all the things on the first axis together with their changes” (Saussure 1916, 80). Taken together, the axes describe a dual reality constituted first by a system of values that can be substituted for one another (AB axis), and then by a system of values that relates different values to one another with respect to time (CD axis).

Thus, language has both synchronic and diachronic aspects. To understand the given state of a language, one must ignore its diachronic aspects. To understand how a language is changing and has changed, one must ignore its synchronic

aspects. Both of these tasks cannot be undertaken at the same time (Raber and Budd 2003).

If we are going to consider such things as categorical families, should we not also consider such a question as, "What is real?" A more important question may be, "Can scholars from different fields conceive of the world in the same (or in sufficiently similar) ways?" If the answer is "Yes," we must then ask whether the scholars can *speak* about the world in the same ways. The narrative reform we advocate must be grounded in something, and that something must be grounded in what people exercising common sense would say is real. The actual objects of the world do not depend on our minds and representations for their existence, even as interpretation (and even, in some important sense, perception; see Merleau-Ponty 1961) may so depend. It is up to us to name the things and to describe them, but the properties of things *do* exist. This admission is a meta-physical commitment. The argument made here is that there are levels of being in the world, as has been demonstrated earlier. It is the definition of the levels and the identification of how to describe them that are the challenges presented to researchers. Heil (2003, 31) expresses the challenge thus: "No finite world is big enough to hold concrete representations of every way it is or could be." Nonetheless, effective agreement can be reached by researchers.

In an iSchool where interdisciplinarity is a challenge, a tactic could be to meld the suggestions made here to enable the scholars with distinct disciplinary backgrounds to articulate theoretical and conceptual foundations explicitly so that colleagues can comprehend them. Where there are existing models, these can be shared within the context of a mutual question, such as one relating to the information-seeking behaviour of a group of people for some unifying purpose (such as scientific discovery). At that point the scholars could turn to the semiotic and communicative modelling presented here to clarify the disciplinary positions and the possibilities for forging integrated interdisciplinary work. The result could then be that which Sternberg (1996, 128) suggests: balancing the creative, analytical, and practical intelligences of the participants to make for what he calls "successful intelligence": knowing how and when to employ each form of intelligence to meet the ultimate end of answering the research question. At the end of the day there is collective accomplishment and the building of awareness and results that would not be possible within each separate discipline. Thus, an iSchool can be productive in new ways that would otherwise be impossible; the breakdown of incommensurability itself will enable more complete understanding on the part of the participants, and the understanding paves the way for new combinations of ideas and, possibly, solutions to challenges.

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