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Challenges to Interdisciplinary Discourse

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Many of the world's critical problems involve human interactions with nature and their long-term implications for environmental quality and the sustainability of resource/ecological systems. These problems are complex—defined by the collective behaviors of people as well as by the structure and function of ecosystems—suggesting that both the social and the natural sciences should focus efforts on dimensions of these problems. The separate efforts of social and natural sciences are unlikely to fully illuminate the fabric of or fashion solutions to environmental problems. Rather, much might be gained by truly interdisciplinary research—endeavors where each constituent discipline informs the investigation of the others and where hypotheses might even be jointly formed. Interdisciplinary research seems the best hope for unraveling the complex interactions between the collective behavior of *Homo sapiens* and their environment and yielding workable solutions to these problems.

If interdisciplinary research is needed to solve critical problems, it seems logical that interdisciplinary research journals would be forthcoming. Indeed it is only with credible platforms for communication that any scientific endeavor can persist. One could go as far as to define a science as simply an ongoing dialog among a group of scientists. Scientists are successful only to the extent that they enter the dialog in a credible fashion, where credibility is certified by the refereed journals of their discipline. For interdisciplinary research (and researchers) to be successful as a science (and scientists), it follows that refereed outlets are needed to certify its discussions. Because it seems unlikely that one discipline will take up reading the other's journals (a painful notion for most), interdisciplinary research journals seem to define a niche in the market for knowledge that needs to be filled if interdisciplinary science is to succeed.

However strong the logic behind the development of interdisciplinary journals, the challenges to their successful implementation—due mainly to the diversity of their implied audience—are substantial. A scientific journal conducts discussions within a disciplinary community. To join such a community usually requires a graduate education where students are taught how to participate in a discipline's discussions. The course of study involves learning how to separate the major from the minor debates, the major from the minor players, and the debatable from the given, and, most importantly, learning the language. Language is most important because scientists speak in dialects that are specialized to their disciplines. Unfortunately, these dialects can at times sound very much like common language, leading the uninitiated reader to the mistaken conclusion that she understands what is being said. In such a light, an interdisciplinary research journal can be viewed as antithetical to the common practice of communication in science. Such a journal, by definition, is a venue for discussions among participants who speak very different languages.

Scholars of rhetoric tell us that science is as much literature as it is systematic inquiry. Deirdre McCloskey (1998) organizes her seminal inquiry into the rhetoric of economics around the notion that economists, as well as those in other fields, communicate mainly with powerful figures of speech—in particular metaphors and appeals to authority—that offer up a compact and rich way of communicating

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within a peer group (even when these figures are enacted without a full understanding of their content). They also have the effect of excluding others from the conversation. A taxonomy of metaphors proposed by Klamor and Leonard (1994) progresses in degree of complexity from the merely pedagogical, through the heuristic, to what they call constitutive metaphors or those that "constitute the discourse." At the first two levels, the meanings are relatively visible. They help connect new situations with existing knowledge and serve to remind us that nearly all learning and language is metaphorical. But metaphors of the constitutive genus are difficult to see because they form the very context of the science. To quote, "constitutive metaphors frame a discursive practice in the way that the U.S. constitution frames U.S. legal discourse" (Klamor and Leonard 1994, p 40). They argue that constitutive metaphors often become invisible to the practitioner of the science and generally provide foundations that are rarely challenged—in effect, they define constellations of maintained hypotheses as well as methodological norms (for example, positivism, deductive reasoning, etc.) that are necessary to focus the work of the discipline. If sometimes transparent to practitioners, constitutive metaphors can be completely invisible to outsiders.

The fundamental challenge to interdisciplinary communication is the different ways we see the world, that is our constitutive metaphors. The greater the divergence between these foundations, the more difficult it is for communication to be effective. Even heuristic metaphors provide communication challenges. For example, when the economist invokes "competition" or the ecologist utters "niche," they are bringing to the discussion powerful imagery that invokes neoclassical production theory with the former, identifiable components of ecosystems with the latter. These deeper meanings are only clear to the properly initiated practitioner. But perhaps the more interesting element of this example is that each word carries metaphorical baggage in both disciplines. When the ecologist uses "competition," it brings to mind epochal forces that exclude all but the best suited species from a niche (in contrast, a competitive market provides a situation that supports several firms). When the economist uses the word niche, she appeals to the notion of a niche market, implying that it is relatively incidental to the operation of the economy as a whole (in contrast, the niche can be viewed as the fundamental "compartment" of an ecosystem). The potential problem then is that these two disciplines appeal to a common pool of language to construct their unique metaphors, a very confusing situation indeed.

Another challenge facing interdisciplinary discourse is divergent perspectives that various disciplines hold regarding *Homo sapiens* and their decisions. Regardless of what we study, we all belong to the species and have some stake in the resolution of these issues. While social scientists are schooled to separate individual values from the study of social behavior (at least to guard against the overtly normative in their work), this is not the case in other disciplines. The presence of a "should" in the discourse generally sets off alarms. In studies of important ecological issues, it is easy to draw normative conclusions, to draw a direct connection between discovery and knowledge of environmental/ecological impacts and social prescription. But knowledge rarely prescribes action (in effect, this perspective tacitly assumes an omnipotent decision-making body to whom one could appeal for the ecologically sound decision). Rather, knowledge can inform decisions, and this defines the crucial interface between social and natural sciences in the study of ecological problems. New knowledge of how a specific ecosystem "works" and the impact that people may have on it provides the starting point for the social scientist's investigation of how choices regarding the use of the system are made (set in the context of the institutional structures of decision making) and therein how the choices could be better informed or "adjusted" to account for social values (recognizing that government more often adjusts the rules under which decisions are made and not the decisions themselves).

Problems often arise at this juncture between the domains of the social and natural sciences. To explore the social implications of an environmental issue, the economist may compress the ecology into a simple production function equation that has little grounding in ecological science. The ecologist may jump from knowledge to prescription without considering the institutional context of decision making. In either case, the work of one discipline can easily be rejected out of hand by scientists in the other because it neglects to address a (the) critical dimension of the problem. This is not generally an obstacle to publication in the usual disciplinary outlets but does define a substantial challenge for an interdisciplinary research publication.

So what do these observations suggest regarding the operation and success of an interdisciplinary journal? Understanding how the approach of interdisciplinary research differs from the usual discourse of science suggests that potential articles be viewed in a different way. Because members of the

implied audience are not all participants in the same science dialogs, that is they are publishing in and reading from different sets of journals, an interdisciplinary journal is not an appropriate outlet for serial publications that build directly from a line of literature within a particular discipline. This suggests that the presentation of models, methods, and data should, to the extent practical, be built from the ground up, rather than rely on oblique citations to other papers.

Knowing that disciplines have unique dialects (in the case of ecology and economics, common language with different meanings) suggests emphasizing exposition of basic premises to a greater extent than usual. While it would be naive to expect authors to cleanse their language of disciplinary metaphors, it seems reasonable to expect a clearer description of framing theory and methodology (maybe some insights into the constitutive metaphors). One way to encourage broader communication is to assign referees from different disciplines to check the clarity of the language. If an article speaks to one constituent discipline but not the others, it may not be appropriate for an interdisciplinary outlet.

While interdisciplinary reviews may provide a useful check on language, clarity, and relevancy of the research, they also raise additional editorial concerns. Using interdisciplinary reviewers leads to split recommendations, not surprisingly, along disciplinary lines. If editorial decisions tend to consistently lean toward one discipline over others, this could lead to disciplinary alienation and eventual withdrawal from the journal. While resolving split recommendations is never an easy matter, even in the single discipline context, it seems especially important that an interdisciplinary journal recognize these types of differences as a substantial source of insight into core issues regarding research methods. Exploiting this source is difficult but there are precedents. One is to invite and encourage referees to publish dissenting opinions or detailed commentary on the articles they review.

The tendency to minimize or compress the content of one discipline to amplify the analysis within one's own highlights an important motivation for doing interdisciplinary research and publishing an interdisciplinary research journal. By publishing in a common forum, scientists of different disciplinary backgrounds can "keep each other honest" by making sure that the natural and social science dimensions of environmental problems are adequately addressed. The returns from such an effort could be substantial. Good social science with bad ecology and vice versa are not likely to have much relevance in policy or other decision processes. Perhaps the best way to accomplish policy-relevant research then is to jointly conduct and publish the research.

Finally, it is worth pointing out that there is an important missionary element to doing interdisciplinary work. That is, an interdisciplinary research outlet provides an opportunity to broaden the perspectives of a diverse audience by demonstrating the relevance of various disciplines in the study of human–nature problems. While these types of efforts may not represent path-breaking science they could have far-reaching impacts on the policy relevance of our collective efforts. It seems a natural role for the interdisciplinary research journal to commission articles that present and debate the structure of interdisciplinary problems and the structure of interdisciplinary research.

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