

Chapter 4

Interdisciplinarity and Laminated Systems

Two years before Roy's death, we met to prepare a proposal to a funding agency to conduct an empirical piece of research and we recorded the conversation. This conversation touched on a number of important issues relating to critical realism and its applications in real life. In particular, we focused on the possibility of doing empirical work in the field. The text below is an account of the conceptual framework that we eventually adopted, and it is focused on issues central to the development of a theory of education: interdisciplinarity, laminated systems, anti-reductionism, and the possibility of providing a bridge to allow us to make a connection between knowing and being. The proposal was unsuccessful.

The existing literature on interdisciplinary research is overwhelmingly epistemologically slanted. Typically absent from it is any discussion about what there is in and about the world that makes interdisciplinarity possible and necessary. The innovation of the approach adopted in this study is that it is informed by the theory of interdisciplinarity developed by Bhaskar and Danermark (2006), which explicitly focuses on ontological as well as epistemological considerations. On the basis of a much fuller and more comprehensive account of interdisciplinarity than has hitherto been available, this study is able to disambiguate and identify barriers or inhibitors on interdisciplinarity which stem from ontological, as well as epistemological, features of the context of interdisciplinary research teams. Accordingly we are able to identify the sites of barriers or inhibitors which have hitherto been unidentified, or misdescribed, in existing studies of interdisciplinary research. It follows also that we are able to identify barriers or inhibitors which have gone unrecognised by the participants themselves in interdisciplinary research projects, or been experienced at best as 'difficulties' or 'tensions'. The first part of the case for supporting this project is therefore that it involves a more comprehensive account of interdisciplinary research and the conditions for its success, than has been available in the past.

It also follows from the analysis that almost all applied research, that is, research outside a very few experimentally closed contexts, necessitates interdisciplinarity of one type or another. The formal conditions for this depend on both complexity and emergence, and since emergence is a universal feature of human life, all applied research which is concerned with human being or about any part of the world which is affected by human being, will necessarily be interdisciplinary. Interdisciplinarity is thus not an optional extra or an afterthought; but rather must be understood to be a necessary condition of applied research from the outset. The second part of the case for supporting this project is that the conditions analysed and thematised in this study are not just conditions for a special kind of applied research (or applied research restricted to a few special domains, or conducted in a special kind of way), but are conditions for applied research as such.

Furthermore, the conditions for interdisciplinary research will in general also be (or overlap with) the conditions for inter-professional co-operation; and these conditions will be presupposed by a great variety of other social practices, including, for example, our ordinary material transactions with one another and nature, and by our explanatory activities in everyday life; that is, by our attempts to explain, influence and change the world. Thus, getting clear about the conditions for success in interdisciplinary research is also a precondition for (clarity about) practical rationality. The wide scope of the analysis proposed here enables it to cast light on the conditions for success in a wide range of other (including non-research) activities; and to unify a range of apparently diverse problem-fields, from that of explanation in history, through that of discovery in science, to that of apparent incommensurability in morality or culture.

However, while many have trumpeted the potential benefits of interdisciplinarity research, there has been little attention paid to (i) the conceptual tools (such as the notion of a laminated system) or (ii) the methodical procedures (e.g. the practice of radical hermeneutic encounter) or (iii) the practical skills necessary to make interdisciplinary research possible and effective, or to the educational or research conditions that good interdisciplinary (alongside good disciplinary) research practice requires. Moreover, in so far as the practices of cross-disciplinary understanding and effective epistemic integration mirror the general problems of understanding and reaching agreement with the social 'other', we would hope that the research being done here will make a contribution to the problem of conflict resolution in general.

Theoretical Background

The general theory of interdisciplinarity is distinctive for two reasons. First, it focuses on ontological as well as epistemological considerations (and grounds for interdisciplinarity). This is enabled by the critical realist revindication of ontology, and the critique of the reduction of ontological to epistemological

concerns in the *epistemic fallacy* (Bhaskar 2008). Second it brings to the fore a differentiated and stratified, non-Humean and non-reductionist view of the world. This involves a critique of *actualism*, or the reduction of natural laws to their instances or empirical grounds. On this, the move from manifest phenomena to underlying generative mechanisms and structures lies at the heart of scientific discovery and indeed provides the rationale for *disciplinarity* in science. The argument from disciplinarity to interdisciplinarity, and for *interdisciplinarity* involves a series of ratchets or steps.

The ontological case for interdisciplinarity begins with the consideration that, outside a few experimentally (and even fewer naturally occurring) closed contexts, a *multiplicity* of causes, mechanisms and potentially theories is always involved in the explanation of any event or concrete phenomenon. This is an index of the *complexity* of the subject matter.

However to get from multi-mechanismicity to multidisciplinarity, we have to add considerations of *emergence* to those of complexity. Briefly an *emergent* level of reality is: (i) unilaterally dependent on a more basic one; (ii) taxonomically irreducible to the more basic one; and additionally, (iii) causally irreducible in the domain in which the basic one operates (Bhaskar 2009). If such emergence is involved, then the characteristic multi-mechanismicity of open systems will have to be studied in a multidisciplinary way, i.e. by (or from the perspectives of) a multiplicity of disciplines. If in addition to an emergent *level*, a qualitatively new or emergent *outcome* is involved in the causal nexus at work, then the knowledge required can no longer be generated by the additive pooling of the knowledge of the various disciplines concerned, but requires a synthetic integration, or genuine interdisciplinarity.

If in turn the *mechanisms* are themselves emergent, then we have the case of what may be called ‘intradisciplinarity’. In critiquing successive reductionist tendencies within disability studies—first biomedical, then socio-economic, then cultural or linguistic—Bhaskar and Danermark (2006) argue that adequate explanation and practice generally in the field of disability studies will require recourse to a *laminated system* constituted by physical, biological (or neurophysiological), psychological, psychosocial, socio-economic, socio-cultural and normative levels. In general, interdisciplinarity (including intradisciplinarity) necessitates the construction of such a laminated system, constituted by a number of irreducible levels. The different levels of a laminated system may need to be studied in a methodologically specific way. The open systems in which human beings act will be characterised not just by complexity and emergence but by some other distinctive features (Bhaskar 1998). These include the irreducibility and mutual implication of social structures and human agency, and the dependence, but non-exhaustion, of social life by its conceptual aspects.

Moving now from ontological to epistemological considerations, the generation of the knowledge of an emergent outcome (or mechanism) will depend upon a species of transdisciplinarity. Typically this involves drawing on the resources of pre-existing knowledge, which may be taken from a whole variety of different cognitive fields, to be exploited in analogies, metaphors and models.

The successful integration of the knowledge of the workings of a laminated system to produce a coherent result will also necessarily depend on cross-disciplinary understanding between the members of the research (or interprofessional) team. It has been argued that the possibility of such cross-disciplinary (or cross-professional) understanding and interdisciplinary (or interprofessional) integration presupposes principles, or are grounded in axioms or postulates, of universal solidarity and axial rationality. However, it should be noted that where the cognitive structures at work in a particular discipline do not permit epistemic integration, then this discipline will need to change (e.g. as a result of some process of immanent critique), in order for such integration to become possible. The order of these processes is: (i) hermeneutic encounter with the practitioners of the other disciplines in a research team, i.e. whose expertise is necessary for the construction of an adequate laminated system; (ii) immanent critique of one or more of the other disciplines involved in the research team, if necessary; (iii) effective epistemic integration.

It follows from this analysis that the conditions for successful interdisciplinary work will include: (i) The disambiguation of ontology from epistemology, and the concomitant acceptance and understanding by practitioners of the tri-unity of ontological realism, epistemological relativism and judgemental rationality; (ii) Anti-reductionism; (iii) The idea of explanation in terms of a laminated system; (iv) What has been termed the ‘holy trinity’ of interdisciplinary research, consisting in: *metatheoretical unity*, comprising minimally points 1–3 above; *methodological specificity*, as the norm for the different levels of the laminated system; and *theoretical pluralism* and *tolerance*; (v) The achievement of: sufficient and generalised cross-disciplinary understanding and epistemic integration to enable a unified explanation; (vi) The dissolution of career, administrative and financial barriers to interdisciplinary research and (vii) A *dialectic of disciplinarity*, turning on depth, and *interdisciplinarity*, revolving around integration, both in adequate *explanation*, and for the *education* or training of prospective interdisciplinary research workers. We need however, to understand how these are manifested in practice.

Once again, these fragments provide us with some insight into Roy’s theory of education. The next chapter provides an account, in Roy’s words, of where all these insights could lead: to a fully developed educational philosophy.