



Paradigms and progress in conservation science

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Moon and Blackman (2014) provide the first accessible guide for natural scientists that outlines ontological, epistemological, and philosophical perspectives on scientific knowledge. Based on our regular discussions between a conservation scientist and a social scientist, we wish to further this contribution by emphasizing the importance of understanding one's own research paradigm. Paradigms are often described as the overarching theoretical structure and fundamental assumptions and values guiding research. We argue that natural science students should be provided with training in the humanities and social sciences so they become better aware of their own scientific paradigm and the existence of others.

We agree with Moon and Blackman and believe natural science researchers must explore the ontological (what actually exists in the world about which humans can acquire knowledge), epistemological (understanding what constitutes knowledge and the validity and scope of that knowledge), and philosophical frameworks that guide perspectives of truth. Yet a critique of paradigms is not commonly taught to students of natural science. Acknowledging the limitations of one's own philosophical perspective is central to multidisciplinary collaborations, which are heavily promoted by current funding agencies. In multidisciplinary projects, scientists from different backgrounds must communicate and share knowledge and results. It is essential that both natural and social scientists have a clear understanding and identification of the disciplinary paradigm in which they are working. Unfortunately, critiquing the framework of scientific knowledge is not a common process for natural scientists. Often by default, natural scientists place themselves within a positivist framework. This approach assumes there is a logical objective reality, independent of the human mind that can only be understood by means of

an idealized, universal, and value-free scientific method (Moon & Blackman 2014). All scientific endeavors, however, incorporate values, and the belief that scientific inquiry is value-free leads only to a potentially dangerous unawareness on the part of researchers of the values incorporated in their own paradigm. Within the realm of natural sciences, a humanization of scientific research is required. This humanization challenges epistemological unconsciousness, which encompasses a preference for objectivity (Steinmetz 2005).

For conservation scientists, particular attention to indigenous, feminist, and postcolonial perspectives would enhance research practices and enrich understanding and interpretation. Such philosophical perspectives can enhance understandings of power and challenge how knowledge is created. Borsius (2006) highlighted that by adopting critical perspectives concerning issues of power and culture, conservation practice can become more effective and just. Indigenous perspectives have much to offer research, policy, and legislation (e.g., Bolivia's Law of the Rights of Mother Earth, influenced by the Andean spiritual worldview). A feminist point of view aids in the recognition of existing gender variables, and postcolonial perspectives decrease the likelihood of cultural imperialism from the researcher.

A natural extension of Moon and Blackman's description of philosophical perspectives would be to consider scientific contributions from researchers outside the global north. Contributions to human understanding of nature have come from many cultures (e.g., China, steeped in Daoist and Confucian worldviews). As the scientific contributions from countries of the global south rapidly increase and transnational projects expand, natural science students should appreciate that different cultures have different approaches to generating

knowledge. Our students should recognize positivism as one of many philosophical perspectives and acknowledge that it is a contested approach. We are not suggesting that students necessarily understand the details of different paradigms and their applications. But if we lead students to believe that a universal, idealized, value-free framework is the only philosophical approach available, they will be unable to recognize how their choice of perspective influences research design, outputs, and interpretations. As Hunter et al. (2014) explain “conservation for both people and all other species will be most effective if we focus on articulating the values we share, being respectful of divergent values.” If we do not teach students how to recognize positivism, critique this approach, and place their perspectives within a wider philosophical framework, it is unlikely that they will even consider the basis of their values, let alone articulate them.

We believe enquiry into a range of philosophical frameworks should be firmly embedded in conservation science curricula, to ensure future researchers and practitioners have a solid understanding of how and why they work in conservation science. Some philosophers are eager to take up this challenge and believe that scientists need to overcome skepticism about philosophers’ abilities to teach philosophy of science to scientists (Grüne-Yanoff 2014). Generating greater epistemological awareness requires contributions from philosophers and those working in other humanities and social sciences. One approach is to develop an interdisciplinary on-line course (mass open on-line course) through the Society

of Conservation Biology. Explaining how science has historically undergone many paradigm shifts may help students appreciate that reasoning and self-correction are strengths of the scientific method. Furthermore, students should recognize conservation is inherently a value-laden subject. We should prepare students not only to understand this, but also to describe and justify their own philosophical perspectives that is, become epistemologically conscious. We are optimistic that even a basic introduction to the humanities and social sciences is an important step in generating respect for each other’s worldviews and will promote much needed collaboration between natural and social scientists and ultimately lead to greater success in the conservation of biodiversity.

Literature Cited

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