Opinion

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Found Formulating Problems, Locating and Assessing Information

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Description

Despite the ease of accessing information in the digital age, environmental science students need information literacy to competently tackle complex problems and sustainability challenges. Students' experiences and teachers' perceptions of student IL skills in an environmental science program were investigated through student questionnaires and teacher interviews to identify students IL competence and eventual learning gaps in the program. Students expressed confidence in IL, more strongly in basic skills such as information search and source criticism than advanced skills; critical thinking and analyzing, interpreting, and creating information. They found formulating problems and locating and assessing information to be challenging, despite repeated training in tutorial groups. Teachers similarly perceived students to be most competent in accessing relevant information while using information is more challenging. This could be linked to the complexity and interdisciplinary environmental science. Findings suggest that IL learning gaps could be bridged by greater focus on systematic IL training, intentional training on advanced skills, and iterative training of both basic and advanced skills by strengthening faculty and librarians collaborative teaching.

Research on Environmental Science and Engineering

The importance of the environment is not new to anyone. Humans have known for millennia that they are inseparable from the environment in which they live. More recently, the media has been inundated with stories about environmental degradation and the havoc that humans as a species are wreaking. Not a day goes by without headlines about the melting ice caps and the seemingly inevitable warming of the Earth. Nonetheless, good news regarding the environment, both on an individual and on an industrial or governmental scale is also common. Yet through all the news, it is important to acknowledge the tireless efforts of scientists toiling in laboratories and staring into computer screens for long hours, trying to figure out how to ameliorate the environment, or at least, trying to find ways to diminish the negative impacts. Research on environmental science and engineering might be among the most important on any university campus, and the scientists who have devoted their lives to this cause should be proud. But what truly constitutes environmental research? One could argue that the answer depends on who you ask and with what lens you look at the problem. In a way, everything can somehow be relevant to the environment. It is -after all- all around us. The origins of the word environment come from Middle English from Old French environ meaning “surroundings”. The word environ itself is derived from en “in” and viron “circuit”. Philosophers of science have long recognized the role of values in science. Shared epistemic values, such as consistency, scope, fruitfulness, generality, and simplicity, are indispensable to the scientific enterprise itself. They are the basis for the rules that determine what constitutes acceptable scientific practice. While no one denies that science depends on epistemic values, many philosophers of science have wrestled with the appropriate role of non-epistemic values, such as social, ethical, and political values. While the value-free ideal—the view that science should be insulated from non-epistemic values and that value-ladenness compromises objectivity—figured prominently among many philosophers of science during the mid-twentieth century, most philosophers of science today accept that some non-epistemic values have a legitimate role to play in science. Under the right conditions, objectivity and value-ladenness can be reconciled. The debate has thus shifted away from issues regarding the value-free ideal and towards questions about how some non-epistemic values can be incorporated into the scientific enterprise itself.

Overall Success of the Environmental Sciences

This article engages with such questions by exploring the environmental sciences, the focus of this Special Issue. These sciences are a mosaic of diverse fields characterized by interdisciplinary, problem-orientation, policy-directedness, and ubiquitous non-epistemic values. Our aim in this article is to address a frequently voiced concern about many environmental science practices: that they ‘crowd out’ or displace significant non-epistemic values by either entailing some non-epistemic values, rather than others, or by obscuring discussion of non-epistemic values altogether. For instance, does assigning monetary value to some parts of nature crowd out the putative intrinsic value of nature? Is the concept of ‘ecosystem health’ problematically value-laden for environmental science? We analyze concerns about crowding out arising in three different

contexts and ask what they teach us about the environmental sciences. Evaluating the overall success of the environmental sciences requires understanding and addressing this putative problem. While other philosophers of science, such as Miles MacLeod and Michiru Nagatsu, focus on the epistemic values or collaborative gains resulting from the interdisciplinary exchange that characterizes the environmental sciences, one might reasonably suppose that even if an environmental science were calibrated for excellent predictive power, explanatory scope, and reliability, many complementary questions would remain about the various ways in which non-epistemic values can and should be incorporated. Even the most epistemically favorable environmental science remains subject to the criticism that it might displace significant non-epistemic values. We show that the alleged problem of crowding out emerges not from the ivory tower, but from active debates within the environmental sciences. As such, this article is driven by three detailed case studies, focusing on the concepts of 'natural capital' and 'ecosystem services' in the interdisciplinary field of ecological economics a type of nature-society dualism presupposed by Social-Ecological Systems (SES) research, and the use of ecosystem health measures to direct environmental policy. In each case study, critics have either charged or implied that the scientific practice in question displaces non-epistemic values in at least one of the two senses distinguished above. Critics argue, in particular, that assigning parts of nature with monetary value precludes assigning these same parts of nature with socially significant non-instrumental value that NSD devalues either nature or society, and that measures of ecosystem health may conceal underlying debates about distinct non-epistemic values.