Disorient Yourself for Science

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Disorient Yourself for Science

I was attracted to science because it offers insiders powerful rules that explain how things work. The rules' power was a source of fascination. It drove the urge to learn more and so to be able to solve problems and make surprising things happen: to build circuits, make liquids change color, control and outsmart animals and plants.

But when classes became more advanced and the playground grew, the rules' immediate power seemed to diminish. Science had to be read about, in books that were not always fascinating. And for a degree, you had to learn about the messy limitations and doubts and controversies surrounding the science as much as about its power. Understanding the different concepts deployed by people with different perspectives, and their disagreements, was a headache. It was (partly) achievable only in a narrow domain.

Later, however, doing research, I could for a while return to the fascination of solving specific problems to contrive experimental conditions—without worrying about others' concepts and interpretations. I suspect many others could tell a similar story.

The difficulty of communication between people educated in widely separated disciplines has been recognized at least since C. P. Snow spoke about the "two cultures" of scientists and literary intellectuals in 1959. Less well known are the gulfs dividing different scientific cultures: Virologists, for example, might find it challenging to discuss their work in detail with ecologists, and geochemists and epidemiologists will both face a learning curve before they can get serious about discussing each other's studies and understandings. So it should not be surprising that planning and performing interdisciplinary or transdisciplinary research strains communication bandwidth. It is much easier to work with people in your own specialty, who know what you're talking about. And that, of course, perpetuates the divisions.

It also limits the prospects for transformative research, Deana D. Pennington and her colleagues hypothesize in the article that begins on page 564. Ingrained concepts and accepted ways of doing things offer short-term satisfaction but stifle the imagination. The disorienting cognitive struggle needed to collaborate across disciplines stimulates transformative learning that pushes science forward, Pennington and her coauthors argue, citing "widespread anecdotal evidence."

The idea of transformative learning, although not originally developed for understanding scientific collaboration, appears to be applicable to science. It forces participants in inter- and transdisciplinary research to become more aware of their assumptions and mental models.

Often, the disorienting effects of collaboration with people from different fields prove daunting: Researchers opt instead to stay within their narrow domain, in safe territory. Sometimes, though, a crisis can overcome the reluctance. It did so in 1993 in the US Southwest, where young adults started dying of a mysterious acute pulmonary syndrome now known to be caused by the Sin Nombre Virus. The scientists who impressively solved that mystery drew on their expertise in multiple fields to solve an urgent problem. They gained immensely from their experiences, and so did science.

We can hope that having more interdisciplinary and transdisciplinary research does not require more crises. Disorientation is good for you and for science. It might be uncomfortable at first, but with effort, it can bring into view new rules that make science more powerful—and fascinating.

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