

# Toward a Trans-Local Knowledge of Water for the Next Generation

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## Abstract:

The challenge of teaching knowledge about global water issues, such as climate change, desertification, and other looming crises, is rooted in the complex nature of the global environment. “Systems thinking” is being drawn upon as an educational objective in some jurisdictions, but a deeper understanding of systems is a secondary-level objective, while the early formation of environmental attitudes at the elementary level is identified as an important sustainability goal. Such attitudes might be facilitated by nurturing young people’s empathy for groups of people suffering in far-away locations from problems with sanitation, water conflict, climate change, and other water-related issues.

The phrase “think globally, act locally” is widely known among thinkers concerned about the environment. It is also applied widely in business management (e.g., Torrington, 1994; Stuart et al, 2007), along with peace movements (e.g., Coates, 1988), and, for better or worse, in social activism (Shaw, 1999). But when it is applied to the teaching of knowledge about water to the next generation, “thinking globally” is somewhat problematic.

First of all, global issues like climate change, ocean acidification, desertification, and resource depletion are highly complex and not easily grasped by young learners who are most likely to encounter severe impacts of these problems later in their lives. Climate change, for example, is

fraught with political controversy and must be thoroughly defended with scientific backing, but this requires a level of science knowledge that most young people do not attain until middle or high school, well into the attitude formation calendar. The mechanisms of climate change, including the effects of greenhouse gasses and the archeological history of the atmosphere as evidenced in ice columns, are basic to the concept, but not grasped without knowledge of numerous components of the science.

Likewise, despite the worldwide impact of ocean acidification on the fish supply available for humanity to harvest, oceanic threats like acidification cannot be easily taught in concrete terms that are typically familiar

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in the experience of young learners. Instead, they must be explained with reference to many other corollary concepts, including calcification, CO<sub>2</sub> absorption, and regional food supplies.

In the same vein, our societies are deeply dependent on multiple sources of fossil energy—such as oil, coal, and gas—that are decreasing unnoticeably, and not in linear fashion, but inexorably, toward depletion, even as they pollute the atmosphere. But this is not locally comprehensible, and neither are the consequences, without reference to global complexities. Despite the inertia of temperature rise, and the apparently interminable march of all of these global conundrums, as well as the severe consequences humanity will share in their wake, the learning curve for these concepts is high and the immediate application is weak, making them a difficult set of lessons to teach and inculcate in basic education.

Yet, the risk of failing to teach global realities from a young age is that the next generation may fail to deeply internalize the far-reaching extent of these problems, as the current generation has arguably failed to do. There is a systematic tendency for educational structures to act so slowly in teaching important environ-

mental knowledge that it is not learned substantially enough by a broad swath of the upcoming population of future citizens to sufficiently address these problems.

To be sure, environmental discourse has been in the rise in social studies textbooks at the secondary level for the past half century (Bromley et al, 2011), but their emphases have tended toward focusing on social issues relevant to global environmental degradation (p. 240), and they have not often focused on particular environmental damage or crises (p. 242). Moreover, while Bromley and colleagues' work examined textbooks at the secondary level, little is known about environmental teaching in the early years. In essence, global problems are too complex to thoroughly teach at the important early stages of schooling and attitude formation, even though they are so critical for the next generation to understand, and education systems change too slowly to meet the knowledge needs of a civilization living through and witnessing global ecological decline. While some progress is being made at the secondary level, questions remain what the role of early learning is for teaching specific matters of global sustainability, such as care for hydrological systems.

What is needed is an ability to think about real-life problems with a global dimension and understand how they can ultimately affect “me.” In their book, *Teaching About the Future*, authors Bishop and Hines (2012) describe “systems thinking,” a paradigm that assumes universal connection of all systems and all of their parts, as a fundamental principle of foresight. Systems-thinking sees parts of a system as interacting in unpredictable ways, and with unexpected results, but, as the authors acknowledge, it is difficult to teach, even in higher education.

Yet, systems-thinking is on the agenda for science education in many educational jurisdictions, despite the cognitive demands, precisely because of its critical importance in dealing with social, environmental, and economic matters sustainably in the future. In the US, for instance, *A Framework for K-12 Science Education* (2012), a common set of science education objectives agreed upon by a 26-state consortium, incorporates “systems” language into its science standards in topics such as “Human Impacts on Earth Systems” (Earth Science Standard 3.C, p. 194), and in Washington State the *Integrated Environmental and Sustainability Education Learning Standards* (2009) explicitly treat “systems thinking” as a standard objective to be aligned with

various grade-level expectations for science and social studies:

Students engage in inquiry and *systems thinking* and use information gained through learning experiences in, about, and for the environment to understand the structure, components, and processes of natural and human-built environments. (“Standard 2: The Natural and Built Environment,” p. 4, italics added.)

Certainly the introduction of “systems” language into curricular goals is an important step toward heightening awareness of global issues. But if “thinking globally” or “systems thinking” are highly difficult to learn because of the level of complexity involved, there is a much more concrete appeal that might be made to introduce young people to global complexity: empathy for others elsewhere. If we learn to connect with students’ feelings of empathy for real people in societies far away who share a difficult reality—that is, if young people can learn the environmental narratives of distant problems, the human experience of those problems should be comprehensible, a step toward connecting local behavior with global consequences. This may lead to heightened understanding of the environmental issues themselves. Empathy can be summoned by teaching young people about the Guinea Worm di-

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sease and its impacts on real people living in distant lands with poor water sanitation (e.g., “Water, Sanitation and Hygiene”); or about growing up in a region with trans-boundary water conflict (e.g., “Why Cooperate Over Water?”); or about surviving numerous crises caused by climate change (e.g., “Climate Change and Disaster Risk Reduction”). The empathy that is generated by clearly presented narratives can spawn cognitive connections that facilitate an understanding of distant local problems with global implications, and ultimately with implications for all localities.

Thus, while local problems are easier to address but do not rise to the level of concern that is appropriate for considering global realities, teaching global problems directly relies on a multiplex of abstractions, making pedagogy more challenging and comprehension less likely. It is the teaching of “local problems elsewhere,” or “trans-local” problems that may serve as a starting point for inculcating the knowledge, skills and dispositions needed for the next generation to build a sustainable global society.

What is needed is an educational research agenda that examines the cognitive benefits of teaching “trans-locally” about environmental and so-

cial problems. This research should investigate how local and global issues can be comprehended by reference to concrete, trans-local narratives.

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