Cult Stud of Sci Educ (2008) 3:227–230
DOI 10.1007/s11422-008-9109-x

EDITORIAL

In search of new lights: getting the most from competing perspectives

Kenneth Tobin

Received: 11 February 2008 / Accepted: 11 February 2008 / Published online: 23 February 2008

Some 18 months ago, Wolff-Michael Roth approached me with the idea to have a special issue on conceptual change theory and sociocultural theories that might be complementary or alternative. He was writing an article that adopted a bottom-up approach to the learning of science, that is, an approach that addressed questions such as "What competencies allow students and interviewers alike to talk about conceptions?" "Under what conditions can researchers extract conceptions from interview materials?" and "What are the implications of the fact that interviewers and students talk about conceptions that researchers denote as 'misconceptions'?" I readily agreed because I regarded the pervasive acceptance of conceptual change theory as an ideology that obscured some of the most important issues in science education. Providing a forum in which the status quo was analyzed alongside of sociocultural alternatives was appealing to me.

For my professional life as a science educator, which began more than 40 years ago, I have experienced the steady rise of conceptual change theory as a theoretical framework for science education. I never fully embraced this framework even though I was primarily interested in teaching and learning of science, and learning to teach science. I carefully studied its tenets, considered how they might be applied, but never really saw any advantage in adopting its premises, largely because conceptual change theory did not address praxis or knowledgeability. Hence, neither teaching nor learning was adequately addressed in ways that shed light on the issues that my research sought to address. I have continuously searched for appropriate theoretical frameworks for my research in science education, being mindful of Max Van Manen's (1990) advice that those seeking to shine fresh light on an issue first must find the light. In so doing I have been mindful that as theories illuminate landscapes in particular ways, they simultaneously obscure or fail to discern other potentially salient issues.

K. Tobin (✉)
Urban Education, The Graduate Center of the City University of New York, 365 5th Avenue, New York, NY 10016-4309, USA
e-mail: ktobin@gc.cuny.edu

Establishing this issue

Issues of theoretical frameworks have implications for science education globally, and we wanted to involve scholars from numerous countries in the dialogue. When Roth introduced the idea of a special issue he also submitted a paper for me to review. The paper laid out an historical, social-cultural framework for science education and in so doing provided a critique of conceptual change theory, identifying its inadequacies, at least as perceived by Roth (Canada), Yew Jin Lee (Singapore), and SungWon Hwang (Korea). I liked the paper and thought it would provoke researchers in our field to reconsider their theoretical standpoints. Furthermore, I felt there were numerous kernels within it around which productive conversations could emerge. The next steps were to invite David Treagust (Australia) and Reinders Duit (Germany) to write a parallel review of research on conceptual change theory and Peter Hewson (USA, South Africa), Andrée Tiberghien (France), and Stella Vosniadou (Greece) to prepare review essays based on their critiques of the Roth et al.'s paper. All of these scholars are internationally renowned as leaders in science education on the topic of conceptual change theory. Finally, I invited Neil Mercer (England), Gordon Wells (USA) and Regina Smardon (USA), eminent scholars from outside of the conceptual change tradition, to critique Treagust and Duit's paper.

Beyond the focal papers

The project described above was ambitious and took considerably longer than I projected, necessitating that I modify an original plan to have the authors of the two focal papers and six review essays participate in an interactive forum. I opted for a three-tiered approach to the forums: first, the invited review essays; second, rejoinders by authors of the focal papers; and third, review essays and interactive forums involving invited science educators not involved in authoring the focal papers and initial sets of review essays.

The two rejoinders have different orientations and contribute to the special issue in distinctive ways. I requested Roth to constrain his rejoinder to focus on the set of papers consisting of the focus paper written by Treagust and Duit and the three associated review essays. In so doing I avoided a situation that bothered me: that Roth's rejoinder would be perceived as editorial bias, providing additional space to reiterate the advantages of the sociocultural standpoint. I regarded Treagust and Duit as courageous in accepting an invitation to publish a review of conceptual change theory in science in a journal having a mission to promote the use of cultural theory in science education. Since these authors had no editorial involvement with the journal, it seemed important and appropriate to ask them to address any salient issues arising from any of the papers.

Justin Dillon, from King's College London in England, agreed to write a review essay in which he addressed both focal papers and the six review essays. Three groups from the east coast of the USA produced interactive forums. The first interactive forum presents a variety of perspectives co-authored by a diverse squad of science educators; Christina Siry, Gail Horowitz, Femi Otulaja, Nicole Gillespie, Ashraf Shady, and Line Augustin. Three museum educators, Jennifer Adams, Lynn Tran, and Preeti Gupta, collaborated with Helen Creedon-O'Hurley (now in Ireland), an urban science teacher, to produce a second interactive forum. Finally, Catherine Milne, Susan Kirch, Sreyashi Jhumki Basu, Mary Leou, and Pamela Fraser-Abder, from New York University, produced a third interactive forum focused on the issues they found most salient to science education.

What has been accomplished?

In creating CSSE we sought to provide a forum for social and cultural theories to inform scholarship in science education. In so doing we did not seek to extinguish psychological models from being employed in research and scholarship in science education, nor do we seek to represent sociocultural frameworks as viable master narratives. Hence, in laying out theories, associated critical reviews, and forum discussions we hope to provide the kernels for fresh conversations and the hoisting of lamplights to illuminate fresh fields for the conduct of research in science education. In so doing, it is important to acknowledge that the theories used to give meaning to social life, while informative, are neither complete nor unique. Through the use of multiple frameworks, different events and phenomena may become salient as objects for research. Kincheloe (2005) advocates multilogicality in which different frameworks are considered a bricolage that brings diverse phenomena to the attention of researchers. Accepting bricolage as a viable approach to research in science education raises the possibility of adopting many of the ideas in this special issue on conceptual change. Rather than adopting this or that approach there might be benefits in using parts of all of both perspectives in science education projects. Some will consider this as heresy. However, I take a stance that there are significant dangers in advocating that one theoretical perspective trumps another for all research in science education.

It is not surprising that scholars have deep commitments to their standpoints and argue with passion for their viability, perhaps failing to acknowledge value in the theoretical stances of others. Within my research squads we continuously change our theoretical commitments, but this does not imply that anything goes. In our projects we are selective and appropriate some theories and not others. However, we do not insist that others adopt our commitments and we are determined to learn from researchers and research that incorporates diverse theoretical perspectives. Ironically, while I embrace others' perspectives and seek to learn from them, my experience in applying for funding and publication is that those in power often require me to change my theoretical frameworks to align with their perspectives. The adoption of a one-size-fits-all perspective can be damaging to progress in educational research as scholars experienced throughout the twentieth century until the present, with the dominance of behaviorism (Watson 1913) and the associated philosophy of positivism (Laudan 1996). My editorial stance is to encourage scholars to harvest the products of hybridity, acknowledging others' rights to be different, and forging cosmopolitanism around different theoretical perspectives through vigorous efforts to create interstitial cultures that produce solidarity within our fields (Appiah 2006). As you will read in the papers constituting this issue, all authors do not share my perspective.

I do not regard this special issue of CSSE either as settling issues or of covering all theoretical ground that needs to be covered. The authors have initiated rich conversations that are long overdue in a world in which dire specters continue to unfold. I am optimistic that through ongoing dialogue new hybrid theories can emerge, heralding a productive era of scholarship in science education, with the potential to benefit the world and its citizens.

References

Appiah, K. A. (2006). *Cosmopolitanism: Ethics in a world of strangers*. New York: W. W. Norton.

Kincheloe, J. L. (2005). On to the next level: Continuing the conceptualization of the bricolage. *Qualitative Inquiry, 11*, 323–350.

Laudan, L. (1996). *Beyond positivism and relativism: Theory, method and evidence*. Boulder: Westview Press.
van Manen, M. (1990). *Researching lived experience: Human science for an action sensitive pedagogy*. New York: State University of New York Press.
Watson, J. B. (1913). Psychology as the behaviorist views it. *Psychological Review, 20*, 158–177.