

## Review

# Who's Asking? Native Science, Western Science, and Science Education

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*D.L. Medin and M. Bang, Who's Asking? Native Science, Western Science, and Science Education, MIT Press, Cambridge, MA, U.S.A. (2014)*

**ABSTRACT:** *“Who's Asking: Native Science, Western Science, and Science Education” explores two key questions for science education, communication and engagement; first, what is science and second, what do different ways of understanding science mean for science and for science engagement practices? Medin and Bang have combined perspectives from the social studies of science, philosophy of science and science education to argue that science could be more inclusive if reframed as a diverse endeavour. Medin and Bang provide a useful, extensive and wide-ranging discussion of how science works, the nature of science, the role of culture, gender and ethnicity in science, biases and norms, as well as how people engage with science and the world around them. They draw on their collaborative research developing science education programmes with Native American communities to illustrate the benefits of reconstructing science by drawing on more than ‘Western’ science in education practices. The book argues that reconceptualising science in science education is crucial for developing a more diverse, equitable and inclusive scientific community and scientific practices, as well as improving educational opportunities and outcomes for youth from diverse and non-dominant backgrounds.*

## Review

“Who's Asking: Native Science, Western Science, and Science Education” explores two key questions for science education, communication and engagement in detail; first, what is science and second, what do different ways of understanding science mean for science and for science education practices? The book's authors attempt to convince readers that science could be framed in a more open manner and that such framing would not only be philosophically valuable but could create more inclusive, more diverse forms of science education, thus laying the foundations for a more inclusive, more diverse community of

scientists, and thus better science. Diversity and equity in science education are therefore to be valued not only for the potentially empowering effects on diverse youth from non-dominant backgrounds, but also because such approaches would benefit the whole scientific endeavour.

Before going much further readers of this review should first be warned that I greatly enjoyed reading “Who’s Asking?” Although I am personally content to justify a focus on diversity and equity in science education, communication and engagement on the basis of social justice alone, I can understand why Medin and Bang find it rhetorically compelling to appeal to Helen Longino’s [8] argument that an inclusive scientific community produces better science. While it seems strange to have to argue repeatedly in favour of accessible, equitable and inclusive science education, given the small amount of change over the last 50 years, such arguments remain necessary and Medin and Bang explore such arguments fully in their book. Medin and Bang have written at length about topics close to my own research interests, and, excitingly (for me) have managed to combine perspectives from the social studies of science, philosophy of science and science education. In terms of the over-arching premise of the book — that science could be more inclusive if reframed as a diverse endeavour with explicit critique of the cultural issues that constitute how it has developed and been taught to date — I must confess I am largely in agreement. As such, from my perspective, this book represents a useful additional tool in thinking about, researching and teaching students about how science works, science communication and science education. What follows is therefore more of an abbreviated journey through some of the book’s key points and reflections on the book’s usefulness than a step by step critique of the book’s content.

### **What is the book about?**

Medin and Bang start their book with the well-established issue of the educational underachievement of students from minority-ethnic backgrounds, students living in poverty and the ensuing under-representation of people from such backgrounds in the scientific community, with a focus on the US context. This then is the underlying problem they seek to address in their book. Unlike other books on general educational inequalities and educational inequalities in STEM (science, technology, engineering, maths) specifically, Medin and Bang address these issues by exploring the nature of science, before moving on to examine how people learn, the influence of culture and to describe some of their own research.

Using an in-depth discussion of the nature of science as a way to foreground educational inequity in STEM is an interesting take on an old problem. Rather than examining the problems with school systems, curricula, teaching strategies, assessment practices or government policy as a starting point, Medin and Bang begin by debating the nature of science (what constitutes ‘science’, how does it work, who does it and what are the ramifications of these patterns). They argue that schools in the US teach ‘Western’ science, with little opportunity for critique, reflection or representation of alternative perspectives,

such as for instance, approaches to understanding science and the world we live in developed amongst Native American communities. In this sense the question in the title “Who’s Asking?” for Medin and Bang underlines their core approach, namely that it is crucial to think critically about who does (and does not) carry out scientific research and to think through the ramifications that homogeneity within the scientific community may have not only on research, but on education and politics more broadly.

Medin and Bang pull together research from a wide-range of fields including philosophy of science, social studies of science, psychology, education and cultural studies. The argument the authors develop in drawing on these different fields reframes science as ‘not’ value neutral, but instead as an already diverse set of culturally-embedded social endeavours. The authors suggest that rather than undermining science, drawing on a range of perspectives is not only what happens in ‘Western’ scientific practices anyway, but appreciating multiple perspectives would serve to strengthen science. Medin and Bang discuss in detail how people encounter, experience and learn about science, nature, culture and their communities, comparing different approaches from Native American communities with those from ‘Western’ science.

The last part of the book explores Medin and Bang’s own research with Native American communities in more detail. It starts with an account of the devastation meted out to Native Americans when their lands were colonised and the use of colonial education systems as a destructive tool for purposes of political control, economic gain and the cultural assimilation of Native Americans into the perspectives and lifestyles of the colonial US European population. Drawing on this historical perspective Medin and Bang suggest that for Native American communities science, education and science education are riddled with tensions, not least in terms of how they have been used to undermine the knowledges and practices of these communities. Over the four penultimate chapters Medin and Bang outline elements of their own work developing science education practices with members of the Menominee Native American community and members of the Native American community based around the American Indian Centre (AIC) in Chicago.

Medin and Bang show how community-based science education research and practice can be redesigned collaboratively with Native American communities, drawing on their traditions, knowledges, practices and ways of seeing the world (which Medin and Bang refer to as ‘relational epistemologies’). The premise that underlies their approach is that developing such collaborative practices will create better educational opportunities and outcomes for Native American youth and, ultimately, better scientific practices. The case studies that the book closes with present the processes and outcomes involved in developing science education summer-school programmes that draw on the relational epistemologies of the Menominee and AIC Native American communities. Medin and Bang first describe shifts in how Menominee and AIC youth saw science (from Western, school-based and of little relevance, to community-based and relevant), before describing elements of how the science education programmes were redesigned collaboratively.

The book concludes with a call to reconceptualise science and science education as a key factor in developing more diverse, equitable and inclusive science and education

practices. Medin and Bang argue that reconstructing what ‘counts’ as science is crucial for developing more equitable science education. Thus the authors conclude that “If this analysis is even part of the story, then underrepresentation in science will never be remedied by better schools, better curricula, better teachers and all other betters that leave science itself as pure and beyond examination” (p. 240).

## Reflections

Given the wide-ranging scope of “Who’s Asking”, what might a reader benefit from, challenge, be frustrated by or otherwise enjoy? Medin and Bang provide an extensive and wide-ranging discussion of how science works, the nature of science, the role of culture, gender and ethnicity in science, biases and norms, as well as how people engage with science and the world around them. This a useful set of critiques for those involved in scientific research and the related fields of science education, communication, policy and sociology. Theirs is an ambitious project, to deconstruct ‘Western’ science in order to reframe a more diverse, more inclusive approach to both science and science education.

The authors address numerous counter-arguments, assumptions and imagined (or perhaps experienced) critiques of their perspectives on science with considerable tenacity. The book therefore includes an extended discussion of debates about the nature of science and its varied social, cultural and political entanglements. To my impatient mind however, such arguments delayed the case studies presented towards the end of the book, which were (for me) amongst the most interesting and useful parts of the book. Developing more equitable and inclusive science education practices is no mean feat and I would have found a more detailed account of the authors collaborative research useful, as, I suspect, would others involved in similar programmes of practice and research. For instance, knowing more about how the projects began, changed over time, their status within the communities involved, the roles of the project team members (including participating students) would have been insightful. Similarly, reflections on what lessons could be learned from these projects for others working in education and science education more broadly as well as those focused on diversity and equity in science education would have been valuable. Perhaps predictably I also think the book could benefit from drawing out lessons about how its content might apply beyond the US context, although to be fair, this is a lot to ask of a book that is already wide-ranging and comprehensive.

In terms of science learning, communication and engagement I found Medin and Bang’s approach to reframing what ‘counts’ as science useful and refreshing. Inclusive STEM engagement projects focusing on teaching or communication techniques, environmental settings or the interests, attitudes or other dispositions of those involved (whether students, museum visitors, family groups, communities or teachers) are doubtless useful, but I find it frustrating when such attempts side step questions about the science involved. To me therefore “Who’s Asking?” works well alongside other books that have sought to re-evaluate the kinds of science involved in science learning and engagement, such as ‘Empowering Science and Mathematics Education in Urban Schools’ [11] and ‘Diversity

and Equity in Science Education' [7]. For example, the notion of "critical science literacy" as developed by Tan et al. [11, p. 77] does not go as far as Medin and Bang's more revisionist concept of relational epistemologies, but both provide useful ways to reframe and rethink how science is positioned in education, communication and engagement opportunities. Such approaches question whether the goals of diverse and equitable science learning, communication and engagement ought to be to bring more of the same kinds of science opportunities to more people, or not. While Medin and Bang are not the first or only authors to examine aspects of these issues (see for example [2, 7–9]), they pull critiques and arguments about science, science education and diversity together in a useful way, complementing these with their own empirical studies.

It is important here to return to broader questions about the potential uses of this book. Those already familiar the work of Helen Longino [8] and Karin Knorr Cetina [6] on the philosophy and sociology of science, Donna Haraway [4] and Sandra Harding [5] on feminist perspectives of science, Lisa Delpit [3] and Tara Yosso [12] on educational equity across subjects and Glen Aikenhead and Masakata Ogawa [1] or William Stanley and Nancy Brickhouse [10] on equity and diversity in multicultural science education will be familiar with the arguments presented in "Who's Asking". Such readers may, however, find that Medin and Bang have developed these ideas and arguments in interesting and useful ways, not least by combining them. I map the scholarly terrain of the book from my perspective in order to situate the book for readers, but also to note that it is not clear to me how people who are not already familiar with many of these ideas and frames of reference would interpret the book. While, as I mentioned above, I enjoyed the book and have tried to outline where I think it could be useful to other scholars, I suspect it may have less appeal to those who are not at least partially on board with some of arguments and political perspectives involved. In this more political sense therefore, I suspect the book may be preaching to the choir.

One final reflection on the book is that it sits somewhere between being a theoretical book and an empirical book. The strength of the book lies in its wide-ranging thoroughness, but at the same time, this thoroughness sometimes makes the book harder to read. For example, in an effort to convince readers of their argument, Medin and Bang work through each sub-section of their overall argument with great patience. What this means however, is that at times the reader must also be patient while the authors work through each point by drawing on several studies, examples from their own lives and theoretical perspectives. While, as a result, no stone goes unturned as the authors unfold their argument in favour of a more inclusive and diverse view of science, at times it became hard to keep the overall argument in mind. But let's be reasonable. Few readers of academic books — which this one certainly is — read such books as though they are novels, that is from cover to cover in a few consecutive sittings. What this book offers is a great resource to dip in and out of, to steal examples from or to prompt reflections on how your own research and practice might frame science in ways that keep some audiences 'in' while others are firmly 'out'.

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