

Innocents Abroad, Redux: Latin America

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ABSTRACT: Travel to a series of Latin American meetings provided the opportunity to discuss matters of common interest concerning teaching and learning within introductory chemistry courses.



KEYWORDS: General Public, First-Year Undergraduate/General, Curriculum

Travel abroad is meant to be entertaining and instructive with opportunities to experience all aspects of the venue that is being visited. The inspiration for the title and those of other related editorials about travel to India^{1,2} comes from Mark Twain:³

Travel is fatal to prejudice, bigotry, and narrow-mindedness, and many of our people need it sorely on these accounts. Broad, wholesome, charitable views of men and things can not be acquired by vegetating in one little corner of the earth all one's lifetime.

Providing access to world views about chemistry education is part of the purview of this *Journal*; making personal contact with potential authors and reviewers in Latin America was part of the Editor's mission in visiting Latin America.

The countries of Central and South America each have their own individual chemistry-related histories, and those timelines often precede related activities in the United States, particularly if one takes a broad definition of chemistry to include fermented beverages, distillation of spirits, and metallurgy, to name a few. From the chemistry education perspective, this *Journal* has published status reports, commentaries, and articles by Latin American educators or in some cases by U.S. authors writing about the region. (The reader is invited to use the search tools at the *JCE* home page on the ACS Publications Web site⁴ to explore some of them; enter the name of the individual country, "Latin America", or a related term.) This is not a new status report but merely a collection of observations from several chemical society meetings at which your Editor was a speaker: the 32nd Congreso Latinoamericano de Química, CLAQ (a meeting of the Federación Latinoamericana de Asociaciones Químicas, FLAQ) held in Concepción, Chile;⁵ the 39th annual meeting of the Brazilian Chemical Society (Sociedade Brasileira de Química, SBQ) in Goiania, Brazil;⁶ and the 2016 Simposio Internacional de Química, SIQ, of the Cuban Chemical Society (Sociedad Cubano Química, SCQ) in

Cayo Santa Maria, Cuba.⁷ The first meeting in Chile had representatives from all over the continent, while the participants at the latter two were more limited to Brazil and Cuba, respectively.

On the basis of this representative (but not statistical) sample, chemistry education occupies the hearts and minds of our neighbors, and the matters of concern would be surprisingly similar and recognizable to those of us in the United States (and perhaps to others across the world). Those questions or issues include three particularly salient ones.

First, how does one keep the students' focus on their learning in the presence of distractions that accompany modern technology? The roles of texting and social media tools on smartphones were obvious when observing students on or near a campus during these trips. (Your Editor openly admits to a certain dependence on Google maps available on his device to keep him from wandering astray during each trek, citing more of a survival use than a social interaction use of the phone.) Related to technology as a distraction is the possibility that these could be new tools for learning once we better understand how to do that and optimize those uses.

Second, what are the best means to "produce" science students at the secondary level with appropriate knowledge and habits of mind to enable them to be interested and competent at the tertiary (i.e., college) level? Many Latin American scientists and educators have taken an interest in K–12 teacher preparation and to aspects related to curricula, just as is the case for many of our readers. Waiting for something good to happen rarely seems as productive as becoming involved; what can and should be done depends on the local tradition, including government and academic politics.

Published: November 8, 2016

Third, what should we teach and to whom? Our constituencies in the discipline are many and varied. At one university, faculty and administrators were in the process of converting 42 different introductory chemistry courses on their campus to just five or six. (Yes, that 42 is not a typo.) Backward design^{8,9} and a careful analysis of each course's learning outcomes were part of their success. Related to this question is the source of content knowledge. Not only do general chemistry textbooks dominate college-level curricula in the United States, but some of the same books (and yes, literally the same books) have a similar level of influence on what gets taught in Latin America. These issues, related to what content gets "covered", have persisted for many years; readers are referred to a paper by Cornog and Colbert in the first volume of *JCE*.¹⁰ The course content of the time does not line up with a modern general chemistry textbook, but the philosophical questions accompanying an analysis of the content are the same: theory or concepts versus practical or algorithmic knowledge, the order or organization of ideas, and whether there is too much to cover, among others.

The Latin American chemical education research (CER) community is small yet beginning to make inroads or at least getting organized. Not only do CER academics see the need for and value of making decisions on the basis of evidence, but in addition, your Editor met and had discussions with research scientists from the traditional disciplines of chemistry who also valued that basis for decision making. *JCE* is a venue and mechanism for dissemination of research and scholarship, most of which does not depend on the language or culture. However, language is a potential stumbling block, especially for authors whose native language is not English. Although the *Journal* tries to help these authors, some reviewers confuse the communication (and language issues) with the validity of the scholarship. (These trips were meant to inform the creation of some tools for authors in *JCE* that would be available in Spanish; *JCE* has no current plans to change its language of publication from English, just to provide more information for the authors in their native language.) Fortunately for your Editor, whose repertoire of fluently spoken languages does not include Spanish or Portuguese, English is commonly spoken by Latin American scientists and chemical educators. My hosts and other people encountered were friendly, warm, and tolerant of my language shortcomings, and they were very knowledgeable about and interested in chemistry education. Now was that "obrigado" or "obrigada"?

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Notes

Views expressed in this editorial are those of the author and not necessarily the views of the ACS.

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- (4) *Journal of Chemical Education* Home Page. <http://pubs.acs.org/journal/jceda8> (accessed October 2016).
- (5) For information about the Chilean meeting, see <http://www.schq.cl/claq2016/> (accessed October 2016).
- (6) For information about the Brazilian meeting, see <http://www.s bq.org.br/39ra/> (accessed October 2016).
- (7) For information about the Cuban meeting, see <http://siq.uclv.edu.cu/> (accessed October 2016).
- (8) Wiggins, G. J.; McTighe, J. *Understanding by Design*, expanded 2nd ed.; Association for Supervision and Curriculum Development: Alexandria, VA, 2005.
- (9) For a description of backward design in chemistry courses, see <https://cns.utexas.edu/tides/teaching-portal/backward-design> (accessed October 2016).
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