

The Past, Present, and Future of the IBL Community in Mathematics

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Introduction

Over the past two decades, a lively community has formed from instructors who teach college mathematics using an inquiry-based learning (IBL) perspective. As a group, these instructors have sought to develop and refine their own IBL teaching, but also to promote and share IBL approaches with colleagues from an ever-increasing array of institutions. While they have made great strides over this time, most students do not yet experience IBL in their undergraduate mathematics classes.

Our team has had the privilege to collaborate for nearly a decade with this community. We see great potential in their efforts, as IBL teaching approaches are aligned with best practices derived from the research on learning (Bransford, Brown, & Cocking, 1999). IBL approaches offer documented positive learning and attitudinal outcomes for students who experience it, and they serve diverse students well, including those who are under-served by more traditional teaching approaches (Kogan & Laursen, 2014; Laursen, Hassi, Kogan, & Weston, 2014). When IBL instructors share stories of how their students' lives are transformed after an IBL experience, we are reminded that education and hard work still offer a path to achieve the American dream—but that dream is threatened when students do not have equal access to these growth opportunities (Kirsch, Braun, Lennon, & Sands, 2016).

Moreover, IBL approaches can help to address common concerns about the size, preparation and diversity of the US workforce in science, technology, engineering and mathematics (STEM) fields. Improving teaching and learning in undergraduate mathematics is central in responding to national calls to increase the numbers and preparation of students who are ready to enter STEM careers and to nurture a STEM workforce that looks more like America. (e.g., PCAST, 2012). Indeed, the IBL Math community has expressed its ongoing desire to help in spreading this teaching method to reach more institutions, instructors, and students.

Findings

Since 2014, our team of scholars at Ethnography & Evaluation Research (E&ER) at the University of Colorado Boulder has been conducting a large, NSF-funded study of the IBL Math community. The study seeks to understand the history and culture of the community and to learn how individuals interacted with different IBL programs and activities as they joined its membership. As part of the study, members of the E&ER team interviewed 50 IBL instructors,

from long-time community members to those brand new to it, about their experience of the community and their hopes and concerns for it. Analysis of these interviews revealed some issues that are relevant to the shared goal of spreading IBL to more institutions, instructors and students. We share these findings now in the interest of ethical communication of research findings to our study participants and to all stakeholders in this vital educational community.

The connection between IBL and R. L. Moore, and his way of teaching, is important. To many long-time faculty members and instructors, this connection cannot be overstated. Without the early network of Moore's former students, and without the financial and organizational efforts of Harry Lucas, the IBL community as it is currently formed would not exist. In 2016 at the Joint Math Meetings, Harry Lucas received special recognition for his Educational Advancement Foundation's continuous efforts to promote active instruction of mathematics over the last two decades. This award was well-earned.

However, although the connection between IBL and Moore has played an important role in the group's history, our analysis of the interview data suggests that it was also a barrier to further spread of IBL teaching. First, use of the name 'Moore method,' or even 'Modified Moore method,' during the early years did not provide insight into the nature of that approach. To understand the reference, instructors had to already know Moore or his academic descendants; the name did not describe the teaching. This issue is less salient now, as the term IBL has come into common use to describe the set of teaching approaches used by community members. Indeed, the use of this terminology, along with the expanded range of beliefs and specific classroom practices included under the inquiry umbrella, has coincided with the growth of the community in the past few years. Our studies show that this broadened conception of IBL is demonstrably supportive of new instructors as they decide whether to try IBL in their classrooms (Hayward, Kogan, & Laursen, 2016).

The second issue, however, remains a barrier to growth. Moore's troubling sexist and racial biases are well known in the IBL Math community, and references to them are common in our interview data. Significantly, also common are stories about how the association of this teaching approach with Moore's social biases has led some instructors to choose not to participate in IBL events, even though they may otherwise be interested in this teaching-centered community. Thus it is clear that, in today's society, the symbolic connection between Moore and IBL is a problem for the spread of IBL. Our data suggest that failure to explicitly address the community's history with Moore will allow this negative association to linger and may limit the growth of IBL in the future.

What Now?

The IBL Math community faces a period of critical decision-making. The community will need to intensify discussions about its values, purpose, and future direction. The establishment of the

SIGMAA for IBL provides one opportunity for such discussion, as the SIGMAA defines its goals and activities. In our view, the community will be well-served if its members directly address the IBL movement's history with Moore and identify their joint vision for the future. We encourage conversation to clarify shared community values, mission, and direction, and to make the community's intentions clear and explicit to future instructors who may wish to join the IBL movement and contribute to its growth, health and sustainability.

We also recognize that the barriers to full inclusion of diverse students, instructors and institutions in mathematics education are not solely symbolic and historic. Both individual beliefs and institutional systems, structures and policies help to promote systemic inequities in mathematics education (NCSM & TODOS, 2016). Yet these are issues that this community is well placed to address, and many of the strategies referenced in the NCSM/TODOS (2016) position statement are applicable to postsecondary as well as K-12 mathematics education. We encourage conversation, awareness and action in all sectors of the IBL Math community to improve equity and inclusion in classroom practice, professional preparation, outreach, education research, and network-building around IBL in college mathematics.

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A more complete scholarly article about these findings is in review at a journal and will be made available at an appropriate juncture in the peer review process.