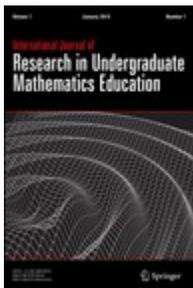


## The Connected World of Inquiry-Based Learning



Teachers looking for resources to aid in the use of IBL methods, where learners become more like apprentices than just listeners and reciters, can find a vast wealth of various types of support. Internet searches for keywords relating to IBL can lead to thousands of results. Fortunately, once a useful source is found, it is apt to lead naturally to another.

In our previous newsletter of January 2016, we reported on the 2015 [Legacy conference](#) held in Austin with its theme of “Empowerment with Inquiry-Based Learning.”

In a five-minute talk session – one of the most popular parts of these conferences – Chris Rasmussen of San Diego State University, publicized the new [International Journal for Research in Undergraduate Mathematics Education](#).

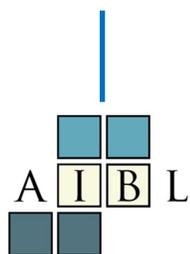
Among the conference audience members were Sandra Laursen and Charles Hayward, co-authors with M. Kogan, of a paper that later appeared in the journal: “Facilitating instructor adoption of inquiry-based learning in college mathematics,” (2016, vol. 2, 59-82). The authors are part of the [Ethnography and Evaluation Research group](#) at the University of Colorado at Boulder that has conducted a number of pioneering studies on IBL in college mathematics that have involved Educational Advancement Foundation (EAF) projects.

Please see [Connected](#), p. 2.

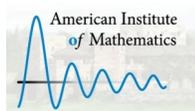


The IBL Forum &  
19th Annual Legacy of  
R.L. Moore Conference  
4 August 2016  
at the MathFest meeting in  
Columbus, Ohio.  
See “IBL Conference” at  
[www.inquirybasedlearning.org](http://www.inquirybasedlearning.org)

*Connected*, continued from p. 1.



Journal of Inquiry-Based  
Learning in Mathematics



The subject of their paper was the impact of higher education faculty development workshops on teaching practice and the qualities that lead to successful workshops. The series of workshops studied was supported by the National Science Foundation and the EAF and held at institutions with EAF-supported IBL centers in their departments of mathematics. Stan Yoshinobu, director of the [Academy of Inquiry-Based Learning](#), helped to recruit a team of experienced workshop leaders.

One of the workshops took place in 2012 at the University of California, Santa Barbara, where the mathematics department is home to the [Center for Mathematical Inquiry](#). There William Ted Mahavier of Lamar University coordinated a four-hour session on “Implementing Inquiry-Based Learning in Calculus III.”

Ted is co-founder of the [Journal of Inquiry-Based Learning in Mathematics](#), an on-line resource of university-level course notes that are freely downloadable, professionally refereed, classroom-tested and constitute a full course.

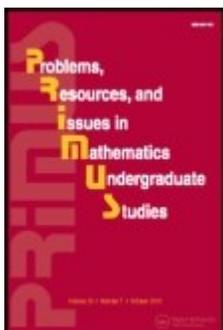
Ted was also one of the organizers of a 2015 workshop in Palo Alto, California, sponsored by the [American Institute of Mathematics](#) (AIM). AIM has been a founding supporter of Math Teachers’ Circles which EAF has also helped to spread to new locations around the country.

In Ted’s workshop, “Research on Inquiry Based Learning in Undergraduate Real Analysis,” as described in our last newsletter, the participants focused on identifying tractable research questions and on how to design high-quality studies to address these questions.

The workshop had 19 participants, one of whom was Patrick Rault of the State University of New York College at Geneseo. Patrick, soon to be moving to the University of Arizona, was a principal organizer of the [Greater Upstate New York Inquiry-Based Learning Consortium](#) along with Jane Cushman at Buffalo State College, Ryan Gantner of St. John Fisher College in Rochester, Yousuf George of Nazareth College also in Rochester, and Margaret Morrow of SUNY Plattsburgh.

Since the beginning of this group in 2014 it has grown to include 52 courses in the region taught using IBL by 16 different instructors in the 2015-2016 academic year, plus more that were taught by people who had no previous direct connections to the consortium but became interested in IBL through people who did. It has held IBL sessions at local Mathematical Association of America meetings with upwards of 20 people in attendance, and has an e-mail list of people in the region with interest in IBL.

The founding members of the consortium are planning a publication about it for the journal *PRIMUS: Problems, Resources, and Issues in Mathematics Undergraduate Studies* which has been the home for an increasing number of articles relating to IBL over the last several years. Special issues have included one devoted to “Using IBL in Mathematics for Liberal Arts Courses”, organized by the project Discovering the Art of Mathematics: Mathematical Inquiry in the Liberal Arts (namely, Philip K. Hotchkiss, Volker Ecke, Julian F. Fleron and Christine von Renesse).



More recently, another issue, devoted to “Teaching Inquiry,” was organized by Brian Katz and Elizabeth Thoren. A third example is two special issues in 2015 devoted to the flipped classroom which included an article by Robert Talbert on “Inverting the Transition-to-Proof Classroom.”

All of the PRIMUS authors mentioned here have participated in IBL–Legacy of R.L. Moore Conferences. In particular, returning to the starting point of this meandering thread, at the 2015 conference Robert gave a talk on “[Flipped Infrastructures for Inquiry-Based Learning](#)” in a session devoted to this new course environment. As he reports in his blog, *Casting Out Nines*, he is writing a book on flipped learning in universities.



### Web Links

- 2015 IBL – Legacy of R.L. Moore Conference: [legacyrlmoore.org/Reports/201506/program.html](http://legacyrlmoore.org/Reports/201506/program.html)
- Ethnography and Evaluation Research group: [www.colorado.edu/eer/research/steminquiry.html](http://www.colorado.edu/eer/research/steminquiry.html)
- Academy of Inquiry Based Learning: [www.inquirybasedlearning.org](http://www.inquirybasedlearning.org)
- University of California, Santa Barbara: [math.ucsb.edu/department/cmi/](http://math.ucsb.edu/department/cmi/)
- *Journal of Inquiry-Based Learning in Mathematics*: [www.jiblm.org](http://www.jiblm.org)
- AIM IBL workshop: [aimath.org/pastworkshops/iblanalysis.html](http://aimath.org/pastworkshops/iblanalysis.html)
- Math Teachers’ Circles: [www.mathteacherscircle.org/](http://www.mathteacherscircle.org/)
- Greater Upstate New York Inquiry-Based Learning Consortium: [citadel.sjfc.edu/faculty/rgantner/ibl/](http://citadel.sjfc.edu/faculty/rgantner/ibl/)
- Discovering the Art of Mathematics: [www.artofmathematics.org](http://www.artofmathematics.org)
- Robert Talbert’s blog, *Casting Out Nines*: [rtalbert.org/blog/](http://rtalbert.org/blog/)

## News Notes

Summer 2017 Workshops  
at Cal Poly, San Luis Obispo

Three IBL Workshops, dates TBD

See under “IBL Workshops” at  
[www.inquirybasedlearning.org](http://www.inquirybasedlearning.org)

From the website:

Mathematics departments across the country face challenges helping their students move beyond the procedural learning that typically dominates their pre-collegiate math experiences. Inquiry-based learning has proven to be an excellent tool to address some of the shortcomings in the mathematical education of students. The IBL Workshop focuses on supporting college math instructors to implement IBL methods.

These [NSF funded] PRODUCT IBL Workshops are practical, hands-on, and interactive workshops for college math instructors interested in teaching via IBL or hybrid IBL. The focus of the workshops is on developing the skills and practices necessary for successful implementation of IBL.

“The real issue in adopting a problem-solving approach to teaching mathematics is *when* to introduce exploratory tasks, *when* to intervene, and in what way. Thus it is the “when” that is the real problem for teachers, not the “what”. There is of course no general theory which tells one how to act, but there are ways to prepare for action. ...

Readers are invited to engage in a series of tasks, some mathematical and some reflective, through which they might consider conjectures about the origins and state of problematicity, about how and when students can be invited to engage with problems, about how and when a teacher might intervene, and why.”

James Mason (University of Oxford and Open University), “When Is a Problem...? ‘When’ Is Actually the Problem!” *Posing and Solving Mathematical Problems: Advances and New Perspectives*. Eds. P. Felmer, E. Pehkonen, J. Kilpatrick. Springer, 2016. pp. 263-285.

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