

Access, Awareness, Audience: The Function of Traveling Introductory Workshops in Discipline-Based Professional Development

Summative Evaluation Report from PRODUCT Traveling Workshops

Devan Daly, Tim Archie, Sandra Laursen, & Chuck Hayward

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The PRODUCT short workshops were first proposed in 2015 as a complementary model to the intensive summer workshops. Both models serve as professional development opportunities for mathematics instructors to learn about inquiry-based learning (IBL). The short workshops were intended to provide an introduction to IBL, while the intensive summer workshops offered a more in-depth, implementation-focused experience (Yoshinobu et al., 2021). Recognizing that “short” workshops varied in length, project team members began referring to them as “traveling” workshops (TWS) to highlight that, for these workshops, facilitators traveled to the audience, whereas in the summer participants traveled to the workshop site.

Between 2017 and 2020, the project supported 26 traveling workshops reaching at least 500 participants. The workshops were between 1-8 hours in length and were held at various institutions across the country, including two- and four-year colleges and sessions held at professional development conferences of the MAA and AMATYC.

The project proposal outlined several goals of the traveling workshops, namely to:

1. Increase awareness of IBL methods
2. Enhance component skills of IBL
3. Recruit new audiences of faculty into IBL teaching
4. Reach departments or groups not yet active in IBL
5. Offer an “on-ramp” to IBL practice

Additionally, the proposal highlights three evaluation questions:

1. Who participates in the short workshops, with what interests and motivations to attend?
2. What are the quality and effectiveness of the workshops?
3. What actions do participants take (or not) following the short workshop?

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Data Sources and their Limitations

For this report we draw on two surveys as sources of participant data, and on reflections and materials provided by facilitators. Workshop attendees were asked to complete a very short post-workshop survey at the end of each workshop, which focused on their experience of the workshop. Then a more extensive follow-up survey about implementation was sent in late 2020 to all participants who provided contact information ($n = 270$). In all, 328 post-survey responses were collected from an estimated 470 participants from 24 workshops, for an overall response rate of 70%. Sixty-six follow-up survey responses were collected for a response rate of 25%. See Appendix A for additional methods details.

While the response to the post-survey was high (70%) and likely representative of the workshop population, the follow-up survey had a lower response rate (25%) and cannot be considered representative. The follow-up was sent to all workshop participants in late 2020, and consequently there was variability in the time between workshop attendance and follow-up, ranging up to 3 years. However, this response rate is comparable to results from a similar delayed follow-up study of a modest-scale professional development activity, which had a response rate of 17% (Laursen & Lynds, 2019). Given this response rate, the high reports of IBL implementation in particular may be skewed due to non-response bias where the follow-up survey respondents are likely those participants who were most interested or enthusiastic about IBL.

Purpose and Structure of Report

In this report, we look at findings from post-workshop and follow-up surveys to assess whether the traveling workshops accomplished the goals set out in the initial project proposal. The headings in the report correspond to objectives described in the proposal. In each section, we identify evidence that bears on these goals.

In certain instances, it is beneficial to frame the traveling workshop findings in relation to the intensive workshops, which have a robust data set of similar measures and can provide a helpful baseline with which to understand the traveling workshop results. However, these two models have inherently different roles and a direct comparison of outcomes between the two is not warranted.

Please see the appendices for additional details, including references and methods.

Proposal Goal 1: Increase Awareness of IBL Methods

One of the primary goals of the traveling workshops was to increase awareness of IBL methods. To assess whether this goal was met, we look to the survey measure asking participants to rate their knowledge of IBL methods compared to before the workshop. Increasing knowledge of IBL has been shown to be one element that may contribute to changes in instructors' behavior when combined with other factors, such as institutional support and belief in the effectiveness of IBL as a teaching method (Archie et al., 2021).

The traveling workshops were successful in increasing awareness of IBL methods, as 89% of post-survey respondents reported an increase in their knowledge of IBL methods compared to before the workshop (54% reported that their knowledge increased “a little more” and 35% “a lot more”). No significant differences were found in this measure based on career stage, institution type, gender, race, or ethnicity, indicating that the workshops were successful in achieving this goal among a diverse range of instructors.

Proposal Goal 2: Enhance Component Skills of IBL

A second goal of the traveling workshops was to enhance component skills of IBL. The original proposal postulated that skills such as facilitating group work, posing questions to probe student thinking, peer instruction, and assessment would be good topics for shorter workshops that could pique instructors’ curiosity and offer skills useful for IBL and other active learning pedagogies. A general introductory workshop (“IBL 101”) was also proposed.

In practice, skills-focused workshops did not catch on with facilitators. Traveling workshop content was therefore non-standardized and varied by audience and facilitator preference, with the majority of workshops providing a general introduction to IBL. A few workshops emphasized enhancing specific skills, such as assessment techniques, facilitating discussions, and generating classroom materials, and one centered on a particular student audience, instructors of pre-service elementary teachers. Workshop leaders also modeled IBL techniques in their facilitation.

Despite the lack of intensive emphasis on skill-building at the traveling workshops, a majority of post-workshop survey respondents reported gains in their skill in inquiry-based teaching after attending a workshop, with 60% reporting that their skill increased “a little more” and 15% reporting that it increased “a lot more.”

Proposal Goal 3: Recruit New Audiences of Faculty into IBL Teaching

Another goal of the traveling workshops was to provide an accessible alternative for faculty who may not be ready or able to commit to a long workshop, and thereby to recruit new audiences of faculty into IBL teaching.

The project proposal outlined certain target audiences, which the traveling workshops successfully reached. These include math departments with interest but limited experience with IBL (5 TWS), MAA section meetings (4 TWS), math departments at two-year colleges (4 TWS), and conferences hosted by the American Mathematical Association of Two Year Colleges (AMATYC) (4 TWS). Other workshops were held at national meetings, regional sections, and departments emphasizing graduate TA development.

Proposal Goal 4: Reach Departments or Groups Not Yet Active in IBL

Instructors without IBL experience represent another type of new audience. About half (48%) of traveling workshop participants reported having no prior experience taking or teaching an IBL course. These participants reported higher gains in their belief in the effectiveness of IBL, knowledge of IBL methods, skill in implementing inquiry-based teaching, and interest in learning more about IBL. These gains are meaningful, as knowledge, skill, and belief in the effectiveness of IBL methods are all factors that may ultimately contribute to implementation changes (Archie et al., 2021).

Proposal Goal 5: Offer an On-Ramp to IBL Practice

The proposal describes an additional goal of the traveling workshops to serve as an “on-ramp” to IBL practice. One way to interpret this concept of an on-ramp is for the workshops to increase instructors’ readiness to teach with IBL. Another way to think of on-ramps is to involve instructors in the broader IBL community, including taking advantage of IBL resources and attending the summer intensive workshops.

Increasing IBL Capacity

Follow-up surveys for both the short and intensive workshops include measures of participants’ self-reported gains in knowledge of IBL learning, skill in inquiry-based teaching, belief in the effectiveness of IBL methods, and motivation to incorporate inquiry into their teaching. We refer to these measures collectively as “IBL capacity.” Traveling workshop post-surveys also include measures of participants’ interest in learning more about IBL and interest in incorporating IBL methods in their teaching.

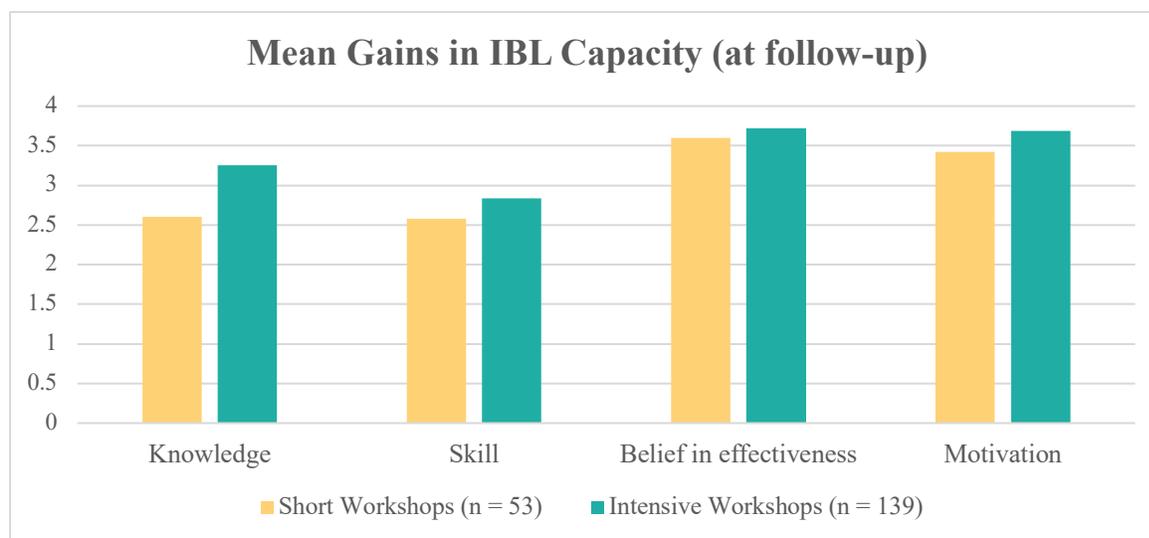


Fig. 1: Mean self-reported gains in IBL capacity from traveling and intensive workshop follow-up surveys. Knowledge scale: 1 (none) to 4 (a lot). Skill scale: 1 (none) to 4 (a lot). Effectiveness scale: 1 (not very effective) to 4 (highly effective). Motivation scale: 1 (not at all) to 4 (highly motivated).

Follow-up survey results show that capacity gains from traveling workshops follow a similar trend to the cumulative intensive workshop data, with participants reporting gains in each of the measures. The greatest increase is seen in participants' belief in the effectiveness of IBL methods, followed by motivation to incorporate IBL into their teaching, knowledge, and skill. Increasing each of these elements is meaningful, as they have been shown to influence implementation practices (Archie et al., 2021).

Post-survey responses additionally show that the majority of attendees (81%) reported an increase in their interest to learn more about IBL methods after attending a traveling workshop, as well as an increase in their interest to incorporate IBL methods into their teaching (83%).

Involvement in the IBL Community

Follow-up respondents reported using several forms of IBL support after attending a traveling workshop, including AIBL resources and attending regional IBL community meetings. These activities reflect participants' engagement in the broader IBL community and interest in IBL.

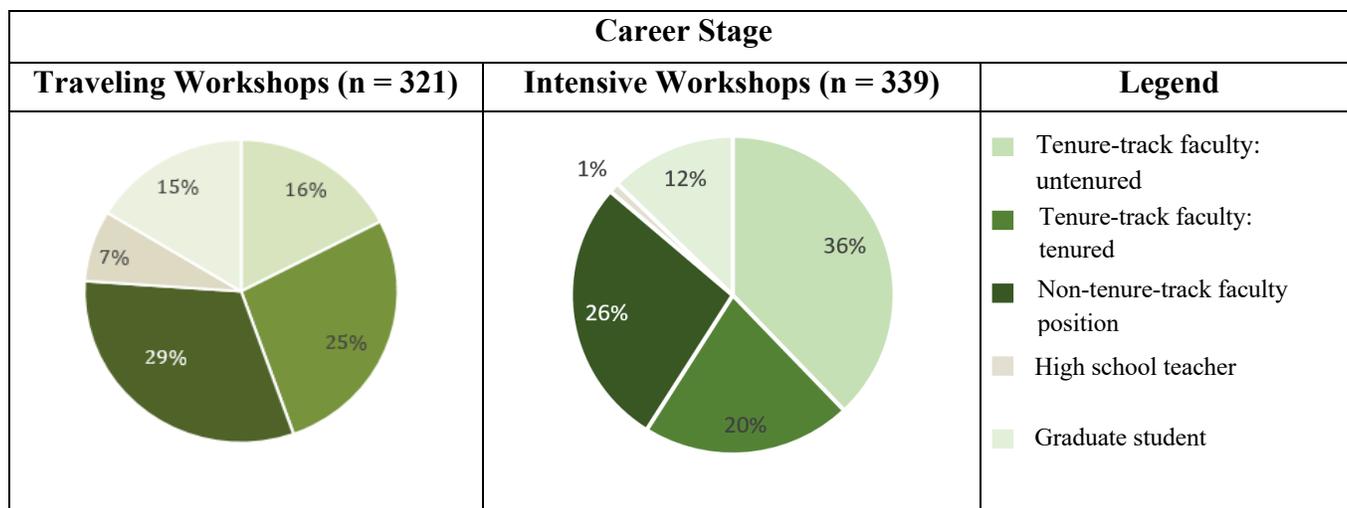
While the data indicate that the traveling workshops served as an “on-ramp” to IBL practice by increasing IBL capacity and IBL community engagement, they do not support the initial theory that the traveling workshops would draw participants to the longer, intensive workshops. Only 3 participants attended an intensive workshop after a traveling workshop.

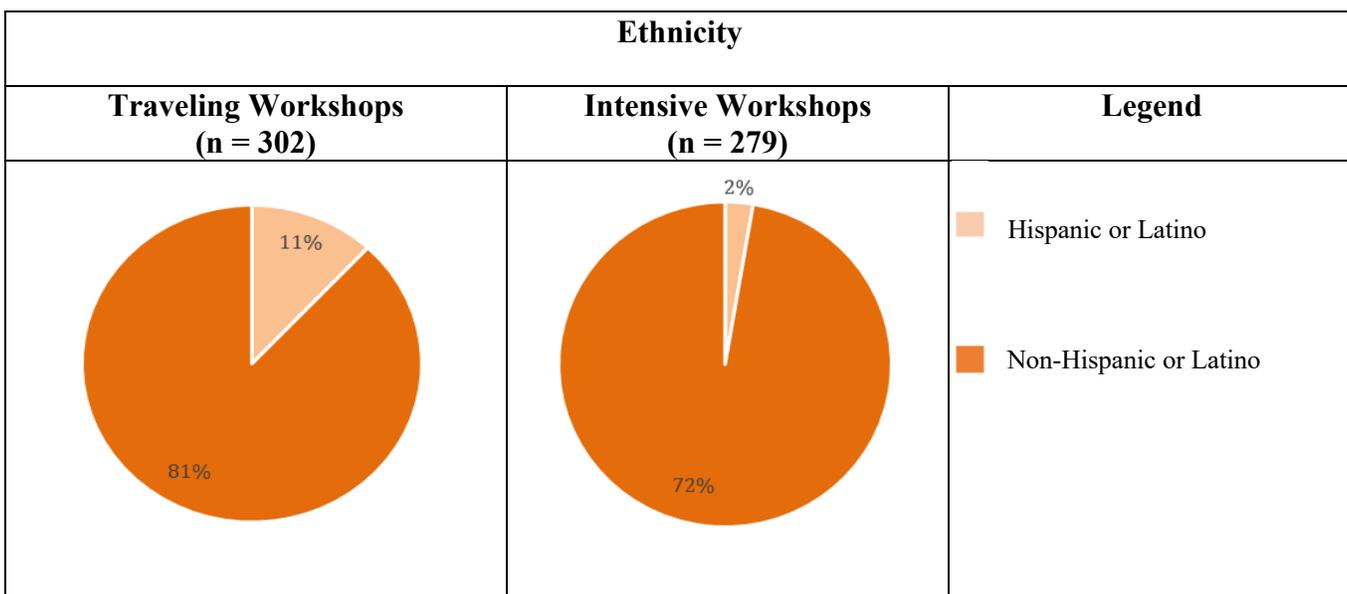
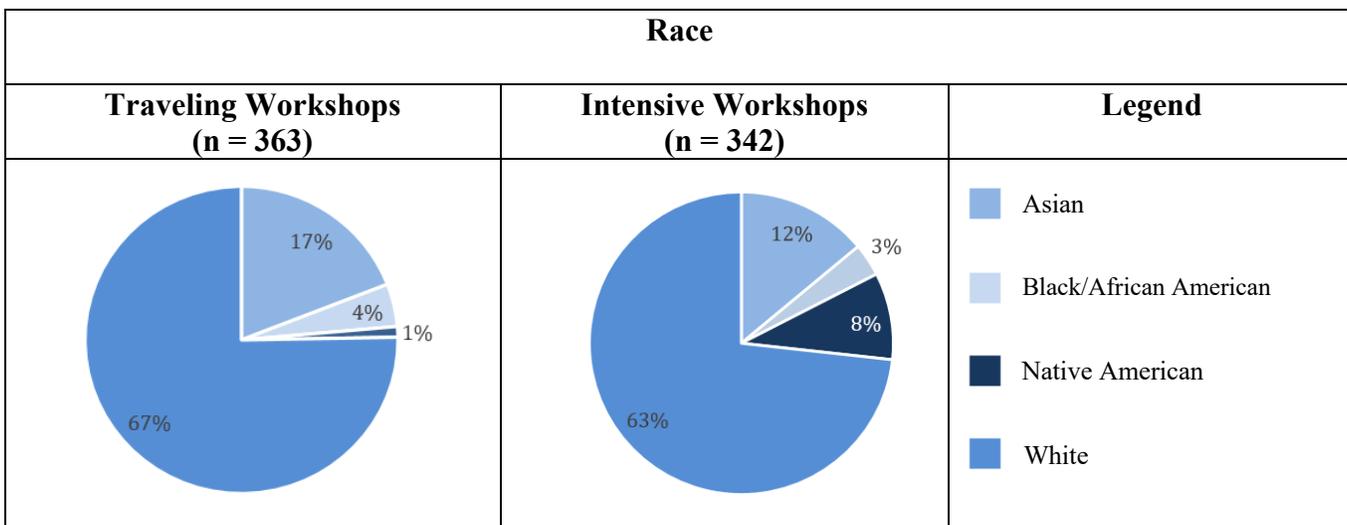
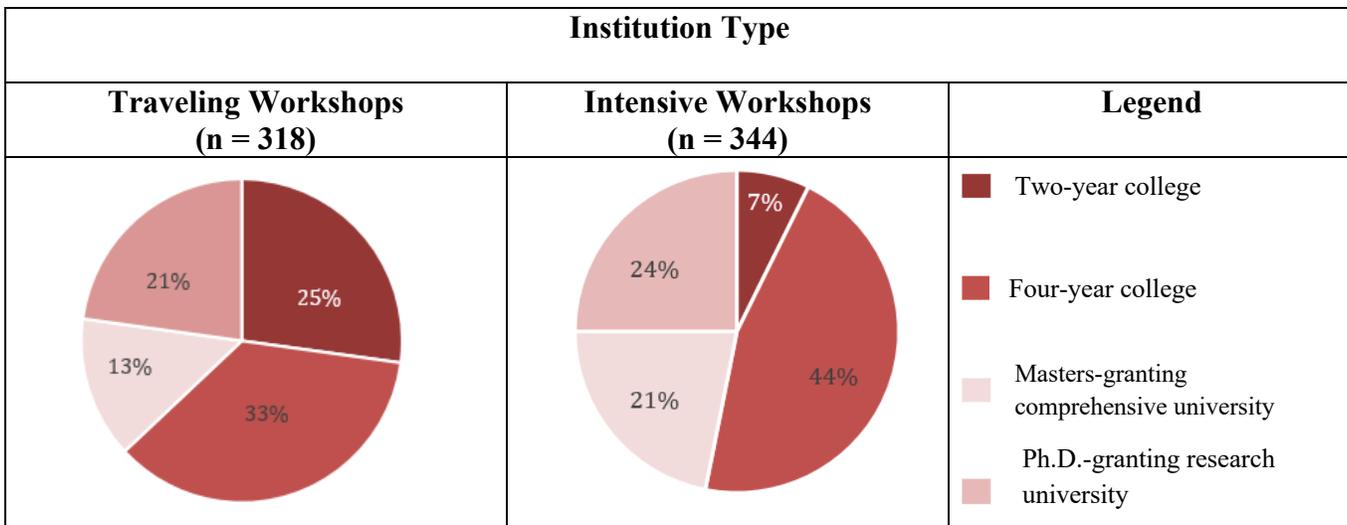
Evaluation Question 1: Who Participated? What were Their Interests & Motivations?

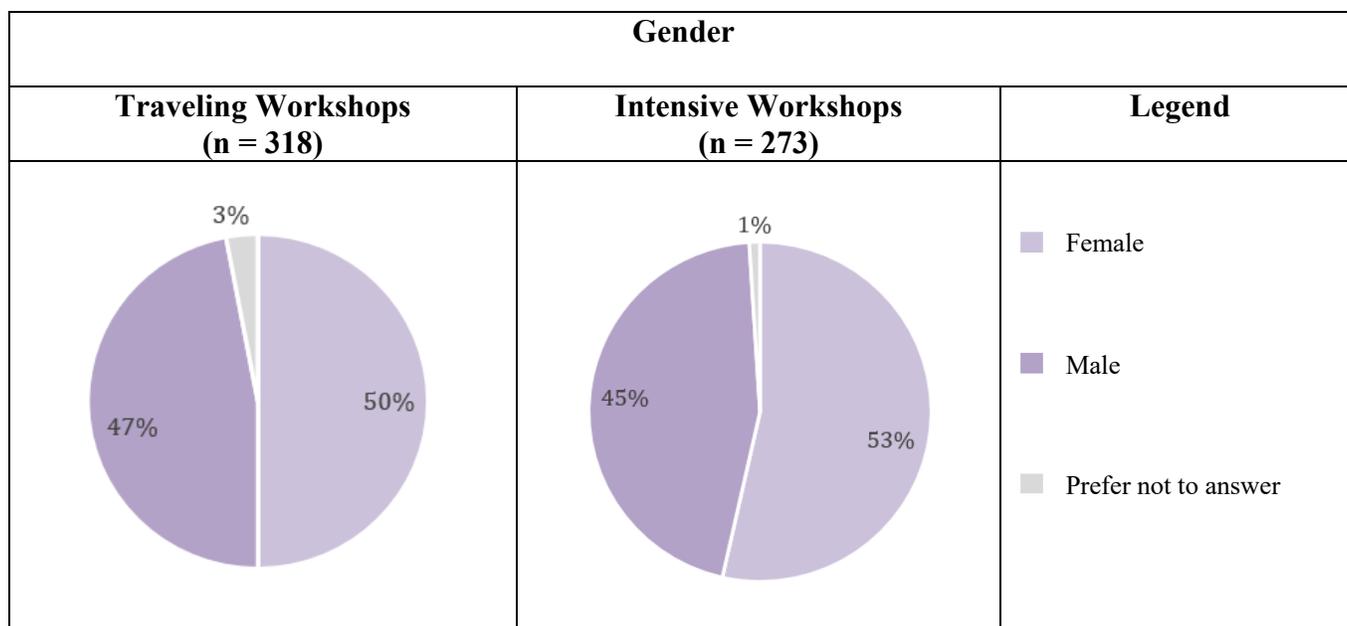
The project proposal included the question: “Who participates in the short workshops, with what interests and motivations to attend?” Here, we address this question by looking at what audiences the workshops reached as well as their self-described motivation for attending.

Demographic Groups

To assess what audiences the traveling workshops reached, it is helpful to compare their attendance to the intensive workshops. Below are graphs comparing the cumulative demographics from the short and intensive workshops.







Compared to the intensive workshops, the traveling workshops reached more people from several groups: non-tenure-track faculty (29% of traveling workshop participants), 2-year college instructors (25%), tenured faculty (25%), Asian-American faculty (17%), graduate students (15%), and Hispanic/Latino faculty (11%).

Motivation for Attending

Post-workshop surveys included an open-ended question about participants' motivation for attending the workshop. The most commonly reported motivation for attending a traveling workshop was to learn more about IBL, with a smaller number of participants reporting attending because of their interest in implementing IBL.

Evaluation Question 2: Quality and Effectiveness of the Workshops

To assess the overall quality and effectiveness of the traveling workshops, we examined workshop ratings, participants' self-reported gains in several IBL measures, and facilitator feedback.

Workshop Ratings

Overall workshop quality was very highly rated with 92% of respondents rating the workshop they attended as above average ("good" or "excellent"). Mean workshop ratings separated by career stage, institution type, gender, race/ethnicity, and prior IBL experience all likewise fell within the range of "good" to "excellent," indicating that the workshops were positively received by a diverse range of faculty. In explaining their ratings, participants noted that the workshops were interactive and informative and spoke highly of the facilitators' presentation of the material.

Participant IBL Gains

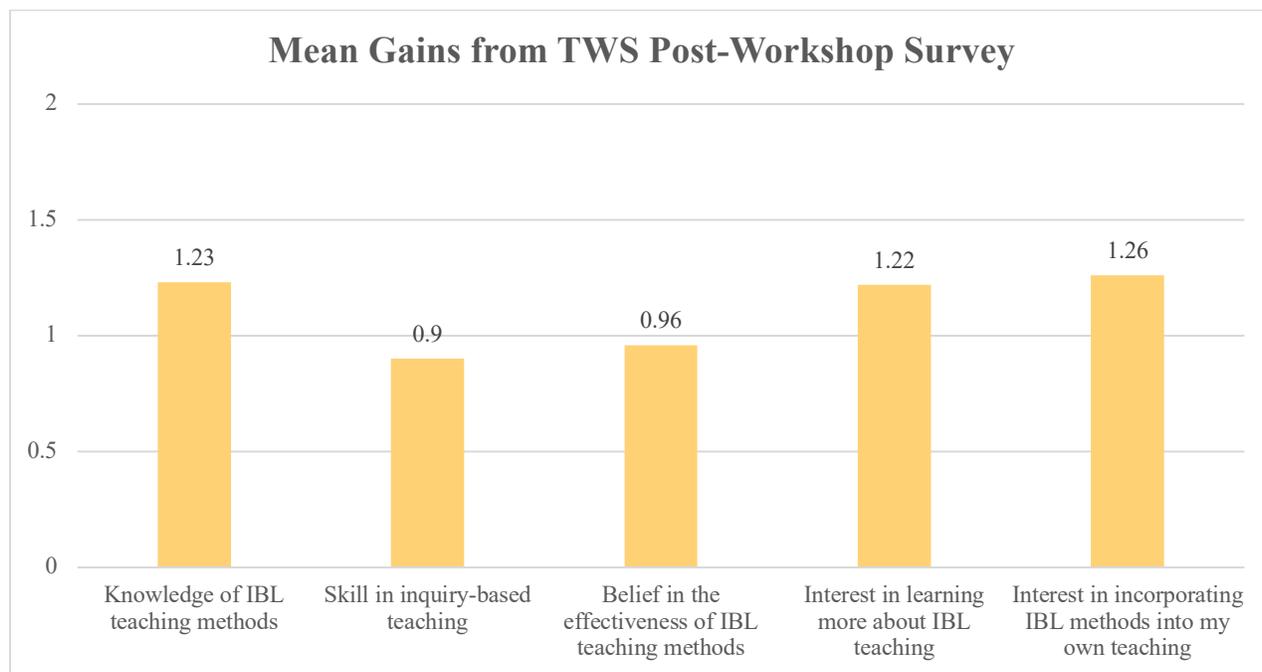


Fig. 2: Cumulative mean participant gains as reported on the TWS post-survey. Scale of -2 (a lot less) to 2 (a lot more).

Post-survey respondents reported gains in several areas compared to before the workshop, with the largest gains in knowledge of IBL methods, interest in learning more about IBL, and interest in incorporating IBL methods into their teaching. These gains reflect growth in workshop participants' learning and interest, and thus highlight the effectiveness of the workshops in promoting IBL and meeting the goals outlined in the proposal. Positive short-term outcomes like these are a necessary first step toward additional learning and engagement with the IBL community.

Facilitator Experience

Facilitators reported generally enjoying the traveling workshops but also found them more challenging to plan and lead than the longer, intensive workshops, working under more stringent time constraints and facing sometimes more skeptical audiences. Audiences were also less likely to be "bought-in" to IBL than those who commit to the longer, intensive workshops and had differing goals based on the specific workshop setting.

Evaluation Question 3: What Actions Do Participants Take (or Not) Following the Traveling Workshops?

Another question outlined in the proposal was: "What actions do participants take (or not) following the short workshop?" We examine this question using responses from the follow-up survey, which directly asked participants about their IBL implementation, including whether they have implemented IBL in their courses and whether they intend to in the future.

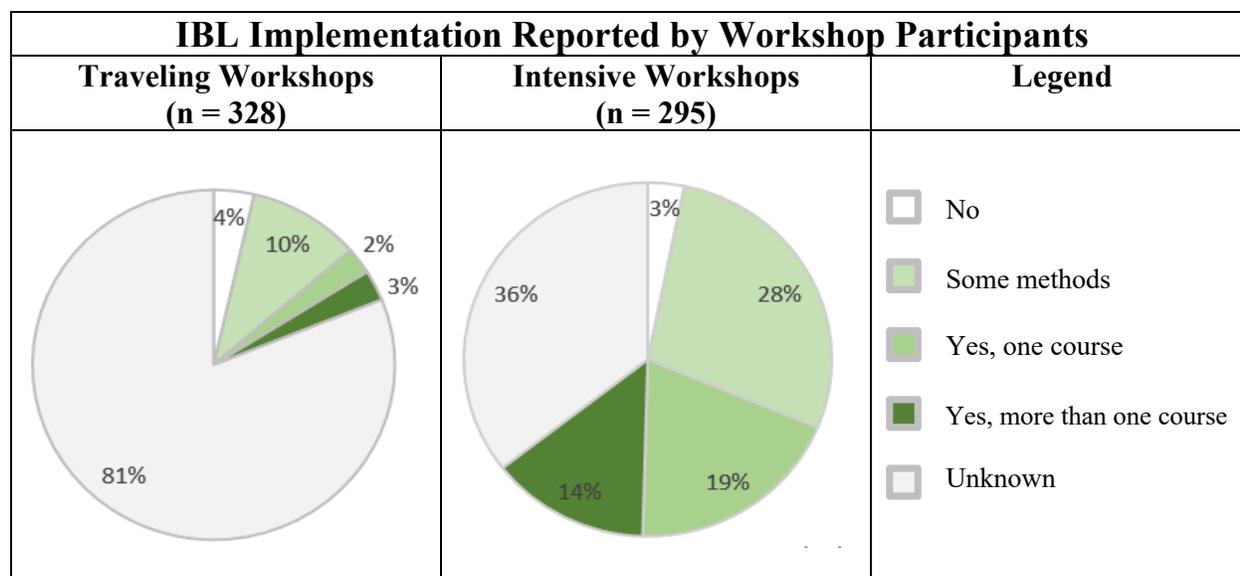


Fig. 3: Implementation rates provided on traveling workshop (TWS) and intensive workshop (IWS) follow-up surveys calculated as lower limits of known data. Unknown response estimates calculated based on follow-up responses (n = 62 for TWS, and n = 191 for IWS).

Several unknown quantities exist within the traveling workshop data set. Overall workshop attendance was estimated by facilitators, and is corroborated in part by post-survey responses (n = 328). Additionally, the follow-up survey was only sent to those participants who both answered the post-survey and provided their contact information (n = 270). We make no assumptions about these unknown participants.

Of the traveling workshop follow-up survey respondents, fifty reported implementing at least some IBL methods in their courses after attending a workshop. In addition, 31 follow-up survey respondents reported that they definitely intend to incorporate IBL into a course in the future, and 25 reported that they will maybe implement an IBL course in the future. Compared to the intensive workshops, traveling workshop participants reported less incorporation of full IBL courses and more incorporation of IBL methods. This is to be expected, as the traveling workshops had less emphasis on practical IBL application and did not include the depth and planning time that is important for participants in the intensive summer workshops.

Building capacity in professional development

In addition to directly providing professional development and support for IBL teaching, a separate goal for the project was to build professional development capacity in undergraduate mathematics education. A specific objective was to develop facilitators' skills and expertise in leading both intensive and traveling workshops. The traveling workshops contributed to this goal, building a presence for IBL by offering numerous workshops that raise the visibility of this work and engaging a sizable cadre of facilitators in this work.

The proposal committed to 15 traveling workshops in Years 3-5 of the award (academic years 2017-18, 18-19, and 19-20), and this goal was exceeded, with 26 workshops offered during that

time to an estimated 500 people. These traveling workshops provided additional opportunities for facilitators to practice their professional development skills. Twenty PRODUCT-trained facilitators were involved in at least one traveling workshop, with 11 leading more than one workshop. Facilitators also led other workshops on their campuses or sponsored by other organizations. Many have continued to lead short (online) workshops in 2020-21, including those supported by the COMMIT Network, which has received NSF funding (DUE-1925188) and is led by four PRODUCT facilitators.

Suggestions for future work

One suggestion for future work is to have a series of traveling workshops that increasingly focus on more practical and targeted skills. While the majority of traveling workshop attendees reported attending due to their interest in learning more about IBL, a fair number reported a desire for more of a practical focus. This was not the intent of these workshops, which were designed as an introduction to IBL methods, but could be beneficial to offer in the future.

One traveling workshop was specifically targeted to instructors teaching a course for pre-service teachers, and participants noted that they greatly appreciated the topical focus and ability to connect with peers teaching a similar course (for more information about this workshop, see Daly, 2020). Thus, topical workshops focused on specific skills, such as mastery-based grading, or planning for a specific course, may benefit participants who have already been introduced to IBL in a more general way or who have some experience practicing IBL and wish to improve their skills. These workshops may additionally provide greater access for instructors who are unable to commit to a longer workshop, particularly if the series is offered in an online format, eliminating travel costs. Such workshops could also spark formation of faculty learning communities around specific topics. We surmise that developing such workshops will require strong facilitators with some specialization and thus a potential area for new work by facilitators trained in this project and others.

Conclusion

Overall, the traveling workshops were successful in meeting nearly all of the goals outlined in the initial project proposal, including increasing awareness of IBL methods, recruiting new audiences of faculty into IBL teaching, and offering an on-ramp to IBL practice. Traveling workshops provided an accessible introduction to IBL for a variety of faculty, and served a different and important role alongside the intensive summer workshops.

References

- Archie, T., Laursen, S. L., Hayward, C. N., Daly, D., & Yoshinobu, S. (2021). Investigating the linkage between professional development and mathematics instructors' adoption of IBL teaching practices. In S. S. Karunakaran & A. Higgins (Eds.), *2021 Research in Undergraduate Mathematics Education Reports* (pp. 1-10).
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<https://www.colorado.edu/eer/content/yoshinobu-workshop-model-preprint-2021>

Appendix A: Methods

Traveling Workshop Surveys

The traveling workshop post-survey was a brief survey designed to be commensurate to the length of the workshops. The survey is comprised of five parts with a total of 13 questions: workshop experience, including overall rating and motivation for attending; prior experience with IBL; IBL learning from the workshop (gains in knowledge, skill, belief in effectiveness, and interest); career and institution information; and demographics.

A PowerPoint slide with a link and QR code for the survey was distributed to workshop facilitators in advance and we asked that 15 minutes be set aside for participants to complete the survey at the end of each workshop. Facilitators reported an exact or estimated attendance for each workshop. This approach led to an overall response rate of about 70%.

A follow-up survey was distributed to all traveling workshop participants who completed the post-survey in late 2020 and assessed similar metrics, including a slightly modified set of IBL capacity measures that more directly aligned with the intensive workshop measures, along with questions about implementation. The final response rate for this survey was 25% of people for whom we had an email address (14% of total estimated workshop attendees).

Intensive Workshop Survey

The intensive workshop data provided in this report comes from the cumulative results of a one-year follow-up survey that was distributed between 2017 and 2020 to intensive workshop participants who participated in summers 2016-2019.

Analysis

Data from post-workshop survey responses were added to a cumulative Excel spreadsheet as they were collected from participants. A summary was also provided to the workshop leaders. Information from this cumulative data set was analyzed in Excel to assess overall workshop rating; IBL gains from the workshop; and patterns within open-ended feedback.

A more complete discussion of the methods is available here:

Laursen, S., & Hayward, C. (2018, June). *IBL on the move*. Evaluation Report: Year 1 of PRODUCT Traveling Workshops. [Report to AIBL] Ethnography & Evaluation Research, University of Colorado Boulder. <https://www.colorado.edu/eer/content/laursen-traveling-workshop-report-2018>

Appendix B: List of Workshops

1. AMATYC Michigan Regional Chapter - October 2017
2. Savannah State University - March 2018
3. AMATYC Arizona Regional Chapter - April 2018
4. MAA Northeast Regional Section - June 2018
5. MAA MathFest (Denver) - August 2018
6. Holyoke Community College - August 2018
7. MAA Seaway Regional Section - October 2018
8. Sacramento State University - October 2018
9. MAA Maryland-DC-Virginia Regional Section - November 2018
10. Oregon State University - November 2018
11. Joint Mathematics Meeting (Baltimore) - January 2019
12. Glendale Community College - January 2019
13. CalState LA - February 2019
14. CSU Fresno - March 2019
15. Florida Atlantic University - April 2019
16. MAA Michigan Regional Section - April 2019
17. Oregon State University - May 2019
18. Pima Community College (virtual) - August 2019
19. Borough of Manhattan Community College - August 2019
20. INFORMS Seattle - October 2019
21. AMATYC National Conference (Milwaukee) - November 2019
22. UC Irvine (virtual) - November 2019
23. AMATYC Texas Regional Chapter - February 2020 *
24. University of Nebraska Omaha (virtual) - May 2020 **
25. Alliance for Michigan IBLers (virtual) - June 2020 **
26. CalPoly San Luis Obispo (virtual) - June 2020 ***

* Separately surveyed by host organization. Results not included in report analysis.

** Co-sponsored and jointly evaluated with the COMMIT Network.

*** Separately surveyed and reported by evaluation team.