

# Innovations in New Instructor Training

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## 1 Introduction

Teaching mathematics is a critical component of any mathematician's career. However, instructor training for mathematicians varies widely across institutions. For example, some universities have a mandatory, credit-bearing orientation course for all instructors prior to teaching, where others allow courses to be taught by graduate students with almost no pedagogical training. This diversity gives rise to a number of interesting questions:

- How much training is appropriate for a novice instructor?
- What are key components of effective instructor training?
- What are key techniques of effective instructor training?
- What is the impact of higher quality teaching on undergraduate education?
- How can one deliver effective instructor training under serious financial/logistical constraints?

There is consensus in the research literature — and indeed in common experience — that a strong mathematical background is insufficient to be a good instructor [3, 5]. However, some research also indicates that good instructor training programs can help novice mathematics instructors make great gains in both pedagogy [1, 2] and pedagogical content knowledge [4]. This research is compelling but emergent: the above questions are still very open, especially in the Canadian context and at the institutional level. The purpose of this workshop was to explore instructor training across institutions, and to allow participants to share their experiences and lessons learned.

## 2 Workshop themes

Two underlying themes informed the structure of the workshop and much of the discussion at it.

- The first theme was that *resources matter*. Despite increasing departmental and institutional interest in mathematics instructor training, acquiring funding and finding willing colleagues for training programs is a perennial challenge.

- The second, related theme was that *many local successes have been achieved in instructor training*. Faculty members at universities across Canada, many of them junior, have collectively developed many innovative, resourceful training components. Though the components have been unevenly evaluated, their impact appears to be significant. One major issue — which this workshop was aimed at alleviating — is that the components constitute a kind of “patchwork quilt” of training programs. Efforts are likely being unnecessarily duplicated.

### 3 Presentation Highlights

Productive discussions were present throughout the workshop. We underline here two types of especially beneficial presentations.

- “Ground-level” presentations provided participants the actual experience of being in a component of instructor training. Two standout presentations were given by Kseniya Garaschuk and Amanda Malloch (University of the Fraser Valley and Camosun College) and Lauren DeDieu (University of Calgary), on using programmed role-play and writing exercises to train instructors for a drop-in tutorial centre and a linear algebra course, respectively. The discussions following these ground-level presentations were especially helpful in allowing participants to translate what they just experienced into the context of their home institution.
- “High-level” presentations provided participants insight into the history, administration and other behind-the-scenes details of instructor training. In one talk, Danny Dyer (Memorial University of Newfoundland), Brian Forrest (University of Waterloo) and Costanza Piccolo (University of British Columbia) discussed developing full-length instructor training courses at their institutions, from the point of view of a developer of a stalled course, an emerging course, and a mature course, respectively. One presentation, singled out as a highlight by many participants in feedback following the workshop, blended the “ground-level” and “high-level” views: Dan Wolczuk (University of Waterloo) and Kari Marken (University of British Columbia) demonstrated and discussed the role of acting and theatre in the classroom.

### 4 Outcomes

One of the goals of this workshop was to allow representatives from key institutions across North America, in particular Canada, to gather for an exchange of ideas on instructor training and instructor training programs. This goal was achieved, and a number of follow-up activities are already underway.

- Representatives at the University of British Columbia and Simon Fraser University will collaborate on the development of an instructor-training course at Simon Fraser University. The collaboration between the University of British Columbia and the University of Waterloo on their respective courses is ongoing.
- Representatives at the University of British Columbia and First Nations University will collaborate on the Indigenization of instructor training components.
- Representatives at the University of Toronto will present follow-up sessions at Mathfest and the Canadian Mathematical Society 2019 Winter Meeting.

In addition to these collaborative outcomes, many participants also confirmed that they will be adopting components and techniques from the workshop into their own instructor training programs.

There were also impactful general outcomes. All participants commented at a “speaking circle” at the end of the workshop about their invigorated sense of purpose and camaraderie. One senior faculty member remarked that the workshop was “the best I have ever attended”. We expect that the network initialized at the workshop will persist, and that many of the components of instructor training presented at the workshop will become staples at Mathematics departments throughout Canada.

## References

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