CoMInDS Program Profile:
Bowling Green State University & University of South Carolina

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Program Snapshot: A peer mentoring model prepares experienced graduate student instructors (GTAs)* to support novice GTAs as they begin teaching their first full course. The program is designed for smaller doctoral departments where GTAs take on this role relatively early in their careers. Combined with a formal pedagogy course, peer mentoring assists a single faculty member in supporting up to 50 GTAs.

How did the program originate?

The program was developed as a formal, organized training for graduate student instructors (GTAs) that includes use of student-centered strategies and a community of peer support. It complements a regular course on teaching mathematics by providing individualized support to GTAs as they embark on their first full course as instructor of record. This may occur fairly early in small departments that need "all hands on deck" to support undergraduate courses. Indeed, national studies suggest that GTAs serve as sole instructors of foundational undergraduate mathematics courses for some 200,000 students each semester (Belnap & Allred, 2009; Lutzer, Rodi, Kirkman, & Maxwell, 2007). Individualized feedback and advice from a mentor may help new teachers advance more quickly in recognizing, analyzing and defending their own pedagogical decisions.

The project was designed in response to observations of differences in novice and experienced GTAs' needs and developed under an implementation and research study supported by the National Science Foundation. Outcomes desired by the institution include a reduction in undergraduate complaints about GTAs, lower DFW rates for undergraduate courses taught by GTAs, and improved retention for sequenced foundational courses. The math department also wishes to demonstrate that their graduate students are thoughtful and caring teachers interested in student-centered instruction. The researchers seek to build a community of practice among GTAs where teaching is a topic of conversation that leads to greater learning. Anecdotally, they note that stronger teaching preparation benefits their program graduates as they enter the job market.

What is the scope of the program?

- At BGSU, 5 mentor GTAs (plus 2 alternates) support ~20 novice GTAs, who begin teaching in their first full-time semester, after a summer course on college-level teaching and learning. The GTAs typically teach in courses in the precalc-calculus sequence or in non-calculus

*Here the term graduate teaching assistant (GTA) includes all graduate students holding or preparing for teaching roles. Local terminology may differ.

introductory courses such as statistics. Alternates take part in the mentor training and provide backup to the assigned mentors.

- At USC, 3 mentor GTAs (plus 1 alternate) support ~13 novice GTAs, who begin leading their own class section in their second year after a year of working as recitation instructors in a multi-section course such as Calculus I or II.

How is the program staffed and funded?

- A faculty member in mathematics education teaches the GTA pedagogy course to all GTAs and runs the mentoring program. Working with the peer mentors takes extra time beyond the formal course load, but because the mentor GTAs provide individualized support to the novice GTAs and share their feedback with the faculty member, that person does not need to observe each GTA, making other aspects of the work more efficient.

- The supervising faculty member works with the mentors and course coordinators to identify any teaching issues or "spot fires as they flare up." The mentors are the front-line "firefighters" while the faculty member is the "fire chief" who teaches the mentors and can re-deploy resources to focus extra support on GTAs who may need it.

- The program is economical because one mentor GTA can support 3-4 novice GTAs. If better teaching improves student success, even a modest increase in student retention is sufficient to pay the GTA peer mentors. For instance, the researchers estimate that a 1-2% decrease in DFW rates will pay for the program in their institutions. In this way, positive outcomes are expected to make the program self-sustaining. Having flexibility in GTA assignments is very useful: for example, a senior graduate student who is assigned to work in the student tutoring center has extra capacity that can be deployed toward mentoring.

What are the main components of the program?

Peer mentors are selected based on applications that document their teaching experiences, including perceived aptitude for implementing student-centered instruction, teaching record (e.g., teaching awards, student evaluations), and stated desire to help novice GTAs to improve teaching. The mentoring duties are folded into the mentors' GTA appointments.

Features of the peer mentorship model include:

- *Mentor seminar*: Mentors gather for one hour each week (15 weeks) for professional development (PD) around their mentoring work. The mentor PD sessions emphasize facilitation skills and is based on literature on productive discourse and reflective practice (e.g., Brookfield, 1995). Evaluation results suggest particularly positive responses to sessions that help mentors productively interact with and offer feedback to their novice

GTAs. There is also early evidence that their own conceptions of teaching become more nuanced and place more emphasis on the quality of instruction, rather than explaining outcomes in terms of student deficits. Mentor seminar topics include:

- Lesson goals, assessments, and mathematical task alignment (weeks 1-2)
- Designing, organizing and implementing the observation protocol (weeks 3-6)
- Facilitating post-observation discussion with individuals (weeks 7-8, 13-14)
- Facilitating discussion at small group meetings (weeks 11-12)
- Critical reflection during small group meetings (week 15)

- *GTA observations:* Each mentor observes four novice GTAs three times per semester and meets with the novice after the session. The observation protocol is based on work by Gleason, Livers and Zelkowski (2017), and it assesses four components of standards-based classroom mathematics teaching for conceptual understanding: student engagement with the content, student engagement with peers, lesson design, and lesson implementation. This protocol is useful for giving feedback to instructors because it views the classroom through the lens of classroom interactions.

  The mentor GTA prioritizes areas for feedback on selected issues using a simple scale of green for good, yellow to indicate areas for growth, and red to indicate an area of immediate concern. To focus the feedback and not overwhelm the novice GTA, no more than two issues of each color are offered in the feedback session.

- *Small-group meetings*: Each mentor facilitates a biweekly small-group meeting with his/her novice GTAs. Mentors have an advance list of topics expected to be useful in the small-group meetings, but they select topics and prepare discussion questions based on the needs of their own small group. For example, the mentor might identify exam design as a suitable topic before the first course exam. Preliminary data shows strong attendance by novice GTAs, who report finding value in being observed and receiving constructive feedback, and feeling more confident about incorporating active learning into their teaching. Mentors are viewed by novice GTAs as providing a safe space to ask questions and admit concerns.

Separately, new GTAs take a pedagogy course and begin teaching. At BGSU, this pre-existing course is taught across three quarters and carries 3 credits per quarter (the same as other graduate mathematics courses). At USC the two-term sequence (1 credit each, where graduate mathematics courses carry 3 credits each) was developed to coordinate with the peer mentor program. The course can focus on broader aspects of teaching and assessment because the peer mentoring program provides the individualized support for implementation. All GTAs take this course, including those with recitation, grading or tutoring assignments as well as those who will serve as instructor of record.

What aspects of this program make it work in the local institutional context?

- *A nurturing and non-competitive environment:* The mentoring program makes support for teaching explicit, but the developers feel that an informal spirit of support and cooperation in the department is important. Mentors must be supportive of the novice GTAs, not competitive with them.

- *Doctoral student involvement:* Graduate students must remain in the program long enough to develop skill and become mentors to other students. Masters students will not typically gain enough teaching experience to serve as effective mentors before they finish their degrees.

- *Pedagogy course support*: A formal pedagogy course supports the mentoring program as a pre- or co-requisite. General information on teaching, assessment and active learning is complemented by individualized observation and support from the mentors.

Leaders' advice about this program model

- Rogers and Yee found it helpful to collaborate on the design of the peer mentoring program and to have each other to talk over ideas and challenges. While they also conduct education research on the peer mentoring program, they do not view such alignment of their teaching roles and scholarly interests as necessary for a peer mentoring program to thrive.

- Experienced graduate students come to the mentor role with fresh perspectives, and it is professionally developmental for them. The role is well defined and guided by the faculty member. In comparison to past program models that matched novice GTAs with faculty as teaching mentors, here the roles and expectations of mentors are more clear and explicit, and the mentoring more consistent across all novice GTAs.

Where can I learn more?

Yee, S. P., & Rogers, K. C. (2017). Mentor professional development for mathematics graduate student instructors. *Proceedings of the 20th Annual Conference on Research in Undergraduate Mathematics Education.* San Diego, February 23-25. http://sigmaa.maa.org/rume/crume2017/Abstracts_Files/Papers/63.pdf

Yee, S.P. & Rogers, K.C. (2017). Training graduate student instructors as peer mentors: How were mentors' views of teaching and learning affected? In T. Olson & L. Venenciano. (Eds.), Proceedings from 44th *Annual Research Council on Mathematics Learning* (RCML, pp. 33-41), Las Vegas, NV: RCML. http://www.rcml-math.org/assets/Proceedings/rcml%20proceedings%202017.pdf

Resources from this program are available on the CoMInDS Instructional Resource site, http://cominds.maa.org/instructional-resources   Search by contributor (Rogers, Yee) to find them.

Sources cited

Belnap, J. K., & Allred, K. (2009). Mathematics teaching assistants: Their instructional involvement and preparation opportunities. In L. L. B. Border (Ed.), *Studies in Graduate and Professional Student Development* (pp. 11–38). Stillwater, OK: New Forums Press, Inc.

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Gleason, J., Livers, S., & Zelkowski, J. (2017). Mathematics Classroom Observation Protocol for Practices (MCOP^2): A validation study. *Investigations in Mathematics Learning, 9*(2). Published online 4/11/17, http://dx.doi.org/10.1080/19477503.2017.1308697

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To cite this resource:

Laursen, S., & Haberler, Z. (2017). CoMInDS Program Profile: Bowling Green State University & University of South Carolina. In *Program Profiles, College Mathematics Instructors Development Source (CoMInDS)*. Washington, DC: Mathematics Association of America. http://cominds.maa.org