Joy Camarao, UNIVERSITY OF CALGARY, eloizza.camarao@ucalgary.ca
Cari Din, UNIVERSITY OF CALGARY, csdin@ucalgary.ca

"A Group of People to Lean On and Learn From": Graduate Teaching Assistant Experiences in a Pedagogy-Focused Community of Practice

ABSTRACT

Graduate teaching assistants (GTAs) influence undergraduate STEM students' learning and experience because they teach most lab sections across STEM disciplines. Despite GTAs' central role in lab teaching, their training is often focused on policies and expectations, rather than teaching effectively. In this study, we took a community of practice (CoP) approach to learning and facilitated a semester-long, pedagogy-focused CoP to address the lack of pedagogical development and support for GTAs. Our purpose was to collect, describe, and develop our understanding of the experiences of GTAs participating in our CoP while teaching reformed undergraduate exercise physiology labs. CoP members completed an asynchronous, SoTL-informed micro-course focused on evidence-informed teaching practices and active student learning support, which was then debriefed at the first CoP meeting. Each subsequent weekly meeting featured 30 minutes of CoP members reflecting on, discussing, and helping each other improve their teaching practices. At the end of the semester, we conducted semi-structured interviews with GTAs to learn about their experiences in the CoP and teaching. We found reflecting on and talking about their teaching was a novel experience for GTAs. They also described implementing teaching practices that were new to them, exercising autonomy, developing confidence, approaching teaching philosophies, and their experiences with psychological safety. Our findings suggest facilitating weekly reflection on teaching in a CoP can provide GTAs with opportunities to develop their teaching practices in meaningful, practical, and (sometimes!) enjoyable ways.

KEYWORDS

STEM graduate teaching assistants, facilitating communities of practice, reflective teaching, psychological safety, pedagogical learning and support

INTRODUCTION

Being a graduate teaching assistant (GTA) is part of many graduate students' journeys. For some, completing a teaching assistantship (TAship) may be a requirement of their graduate program (The Princeton Review, n.d.); for others TAships provide income, teaching opportunities, and serve as an entry point to an academic career (Nasser-Abu Alhija and Fresko 2020). While not all graduate students should (or desire to) teach, and some GTAs play a marking-only role (e.g., Coles et al. 2020), those who do teach can make a lasting impact on their students' learning and experience (Basey, Maines, and Francis 2014; Lee 2019; Roden et al. 2018; Wan et al. 2020). GTAs' pedagogical development is an important Scholarship of Teaching and Learning (SoTL) topic because of the central role they play in

teaching and learning in higher education, which affords GTAs the opportunity to influence the educational cultures they contribute to not only during graduate school but throughout their careers (Wyse, Long, and Ebert-May 2014).

Teaching training and support for STEM GTAs

GTAs teach most lab sections of undergraduate courses in STEM disciplines (Kendall and Schussler 2012; Kurdziel et al. 2003; Reeves et al. 2016). To prepare GTAs for their role, faculties or departments typically organize a one-time training session, usually focused on outlining university policies and expectations (Tomkin et al. 2019). GTAs are often hired because of their disciplinary content knowledge, rather than their capacity to teach the content effectively (Langdon and Wittenberg 2019). Effective teaching goes beyond giving, receiving, and storing content information in a one-way transaction from teacher to student (Kreber 2013). When teaching enables student learning, students become empowered agents, able to perceive a greater purpose to their learning, and able to apply their knowledge far beyond acing a test (Kreber 2013).

Pedagogical programs and courses are widely available for graduate students to participate in across higher education contexts (see Aspenlieder and Vander Kloet 2014 for examples in the Canadian context); however, in most contexts, graduate students must seek out and complete these programs and courses on their own unpaid time (Deacon, Hajek, and Schulz 2017). In research universities, where teaching is often viewed as secondary to research, graduate students are told that time invested in developing their pedagogy is wasted (Connolly et al. 2016; Patel 2017). Connolly and colleagues (2016) found STEM doctoral students were discouraged from pursuing pedagogical learning and development because time spent developing one's teaching was believed to decrease time spent doing research, and thus reduce research productivity. However, Shortlidge and Eddy (2018) found developing evidence-based teaching practices actually increased graduate students' confidence as researchers and in their ability to communicate their work. They also found pedagogical training did not influence the number of research papers published by doctoral students, in their study.

Academic cultures that prioritize research over teaching are often bolstered by the false belief that content knowledge is synonymous with effective teaching (Gardner and Jones 2011). Luft and colleagues (2004) found tenured faculty members believed the ability to teach was innate and did not support graduate students spending time learning about effective teaching practices. GTAs, in Deacon and colleagues' (2017) study, believed experience is the best way to develop their teaching skills, but they lacked feedback from faculty members to help improve their teaching. The near absence of pedagogical support and training leaves many GTAs feeling anxious and unprepared for their teaching responsibilities, especially those who are teaching for the first time (Smollin and Arluke 2014).

The community of practice approach to learning

In a thriving community of practice (CoP), members learn from each other, work collaboratively to solve problems, and collectively improve their practice (Wenger-Trayner and Wenger-Trayner 2015). CoPs have been used in many disciplines to support professional learning, including leadership (e.g., Hanlon and Taylor 2022), health care (e.g., Delgado et al. 2021), and education (Kezar and Gehrke 2017). In higher education, CoPs often involve academics coming together to reflect on their teaching practices and to work together to continuously improve members' impact on student

learning and experience (e.g., Bolander Laksov, Mann, and Dahlgren 2008; Elliott et al. 2016; Herbers et al. 2011).

CoPs in higher education most frequently feature faculty as community members (e.g., Aster, Bouwma-Gearhart, and Fisher 2021; Embrett et al. 2021; Nadelson 2016; Weinberg, Balgopal, and Sample McMeeking 2021), or pre-service teacher communities (e.g., Chaplin and Munn 2020; Hou 2015). We found one study exploring experiences of international GTAs' socialization and teaching self-efficacy through a CoP (Hakkola, Chien, and Pelletreau 2020), one describing the influence and importance of finding support in a community for three math GTAs (Coles et al. 2020), and another with GTAs forming their own teaching forum, akin to a CoP (Milner-Bolotin 2001). However, we found no studies describing a CoP with STEM lab GTAs and faculty members as a site for pedagogical learning and support, therefore, we created a semester-long, pedagogy-focused CoP to support exercise physiology (ex-phys) lab GTAs' teaching and pedagogical learning, within our university context. Our research purpose was to collect, describe, and develop our understanding of the ex-phys lab GTAs' experiences in this CoP.

OUR CONTEXT

Our study is part of a larger, three-year SoTL reform project aimed at enriching teaching and learning in lab-based ex-phys courses at a research-intensive university. During this project, undergraduate ex-phys lab learning activities and assessments were modified to enable experiential learning and add low-stakes, post-lab reflections and an inquiry-based project (see Camarao and Din 2022). An integral part of this SoTL reform project was the creation of a semester-long, pedagogy-focused CoP to support GTAs teaching the reformed undergraduate ex-phys labs. The CoP had two "cycles" (Buysse, Parkman, and Wesley 2003) across two consecutive fall semesters; in each cycle, the CoP consisted of five GTAs and one lab technician along with Joy (one of the paper's authors) and the two CoP leaders. Table 1 details the members of this CoP. Before we developed the CoP at the centre of this study, GTAs teaching the undergraduate ex-phys labs (three hours each week, throughout the 12-week term) attended one faculty-wide training presentation on expectations and best practices for GTAs at the beginning of the semester. Prior to our study, ex-phys lab GTAs met with the lab technician to discuss lab logistics and marking once per week throughout the semester. The lack of focus on developing GTAs' teaching is consistent with literature describing science GTAs' lack of pedagogical training and support (e.g., Gardner and Jones 2011).

Table 1. A snapshot of members in the CoP

			Description
CoP members	Joy		SoTL graduate student; was also a GTA in the faculty, but for a different course
	2 CoP leaders	Cari	SoTL advocate; co-lead of lab reform project; faculty member; leadership and coaching instructor
		Course instructor	Co-lead of lab reform project; faculty member; ex-phys researcher and instructor
	10 GTAs		Graduate students teaching the undergraduate ex-phys labs
	2 lab technicians		Staff who collaborated with the course instructor to create lab materials and supervise GTAs

The pedagogy-focused CoP in action

Micro-course

Cari (one of the paper's authors) worked with the course instructor to create an asynchronous, SoTL-informed micro-course introducing CoP members to evidence-informed teaching topics and practices. The nine modules in the micro-course were: 1) teaching philosophies, 2) constructivist learning theory, 3) designing effective learning outcomes and rubrics, 4) active learning, 5) psychological safety, 6) debriefing a learning activity, 7) experiential learning, 8) best practices for asynchronous and online teaching, and 9) feedback that enhances learning. Micro-course content was developed to bridge the gaps we knew about based on previous iterations of the undergraduate ex-phys labs in our context. Specifically, the labs had a negative reputation among undergraduate students in our faculty due to punitive marking practices, and GTAs had no pedagogical training or ongoing support for developing their teaching practices. In addition to content that would bring GTAs into SoTL and inspire them to begin practicing evidence-informed teaching in their labs, the course instructor also wanted GTAs to be exposed to fundamentals of teaching and learning that could help GTAs develop a psychologically safe space in labs for students to learn in. Module content was shared via short videos, podcasts, and readings (Shamir-Inbal and Blau 2020). The micro-course was self-paced and punctuated with learning activities that relied heavily on reflective questions (Howard 2021). A digital workbook containing the modules was sent to CoP members by Cari, approximately one week prior to the beginning of the semester. GTAs were instructed to complete the micro-course (between six and eight hours) and to be prepared to discuss their learning at the first CoP meeting. At the first meeting, CoP leaders co-facilitated a two-hour micro-course debrief focusing on responses to the reflective questions embedded in modules one week before GTAs began teaching labs. During the debrief, GTAs were encouraged to discuss and ask questions about how the micro-course content could be applied in their lab teaching. Time invested doing and debriefing the micro-course was included in GTAs' paid hours as part of their training. No GTA in our study attended a GTA orientation offered by the campus' centre for teaching and learning prior to the start of the semester.

Weekly CoP meetings

The CoP met each Friday afternoon, after all labs had been taught, for the duration of the semester. In these weekly meetings, CoP members described what went well in their teaching and challenges they would like help in addressing. Although the CoP leaders were not teaching labs, they reflected on their teaching successes and challenges in the same way GTAs, including Joy, were invited to. Discussions focused on the real-life teaching practices of each CoP member and generating practical solutions to problems they brought to the meetings. Time spent in these meetings was also included in GTAs' paid hours.

RESEARCH METHODS

The purpose of our study was to collect data, describe the findings, and develop our understanding of the experiences of GTAs who participated in a semester-long, pedagogy-focused CoP. In this section, we describe the CoP framework and our processes for recruiting participants, collecting interview data, and doing reflexive thematic analysis.

CoP framework

CoPs are "groups of people who share a concern or passion for something they do and learn how to do it better as they interact regularly" (Wenger-Trayner and Wenger-Trayner 2015, 1). An effective CoP helps members grow and develop their practical skills and strategies (Lave and Wenger 1991). In our study, we envisioned CoP members improving their teaching through "thinking together," as described by Pyrko and colleagues (2017) in their work exploring what makes CoPs work. When CoP members think together, they "mutually guide each other through their understandings of the same problems in their area of mutual interests" (Pyrko, Dörfler, and Eden 2017, 389). We worked to support thinking together each week in our CoP and emphasized members learning from and with each other to improve their teaching and learning practices.

Recruitment, participants, and data collection

After obtaining institutional ethical approval for our study (REB 19-0669), the 10 GTAs in the CoP were invited via email to participate in a 60-minute, semi-structured interview with Joy at the end of each semester; a follow up email was sent out to GTAs a week after the first email to continue recruitment. GTAs were informed participation in our study was voluntary and there was no compensation for doing the interview. Seven of 10 GTAs provided informed consent to do an interview, either in-person or on Zoom. The semi-structured interviews included pre-determined yet open-ended questions such as "Can you describe your experiences in the weekly Friday meetings we had, reflecting on our teaching?" and "Can you describe any challenges you might have come across, being part of the CoP?", which offered both structure and flexibility to encourage participants to develop their own thoughts and express their unique feelings while exploring the phenomenon of interests (Sparkes and Smith 2013). The interviews were conducted one-on-one to value participants' individual experiences and potentially increase their comfort with sharing experiences they might not choose to share in a larger group, for example in a focus group interview (Sparkes and Smith 2013). The seven GTAs who participated in our study were all graduate students in the same faculty (kinesiology) though at different stages in their graduate school journey at the time of our study (five master's; two doctoral students). When we include direct quotes from our study participants, we identify them using the following pseudonyms: Sebastian, Emilie, Morgan, Astrid, Becca, Emma, and Sam.

Data analysis

We transcribed each interview verbatim and analyzed transcripts using reflexive thematic analysis (Braun and Clarke 2019). Transcribing the interviews allowed us to begin familiarizing ourselves with the data and it was followed by multiple read-throughs and making extensive initial notes across all interview transcripts (Terry et al. 2017). After immersing ourselves in the data, we began coding using both NVivo, a widely used software in qualitative research, and printed copies of the interview transcripts (Trainor and Bundon 2021). Our coding process involved generating tags or labels, often a "pithy phrase" (Terry et al. 2017, 17), for segments in the data that might help us answer our research question. Four rounds of coding were undertaken to ensure no relevant data were missed. Next, we started developing themes that reflected patterns in the participants' responses. This process involved constant conversation between researchers and revisiting the transcripts to ensure our interpretations of the seven GTAs' responses accurately reflected their experiences in the CoP. This conversation and motion between idea, conversation, and transcript included using visual maps (in

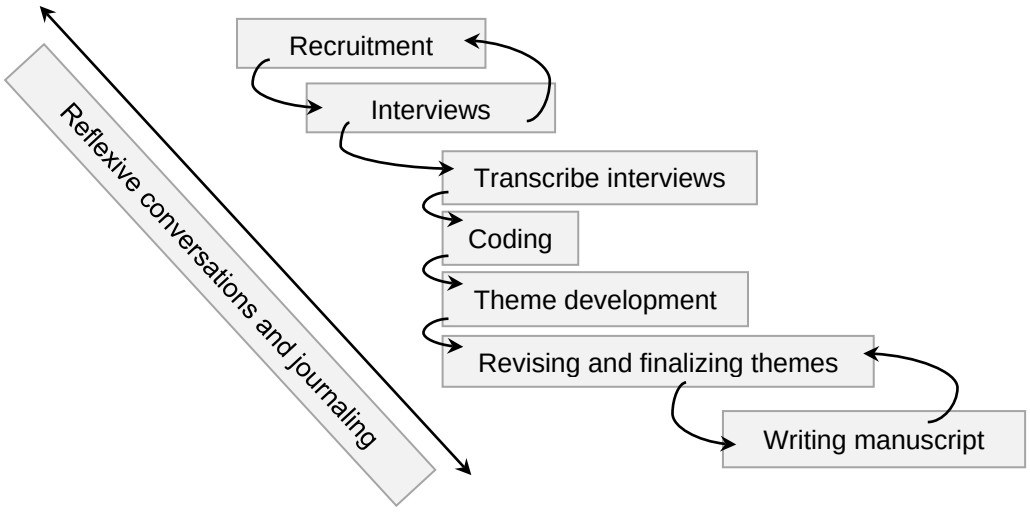
Google Jamboard) to help us see thematic distinctiveness and coherence (Terry et al. 2017). Our reflexive data analysis process, particularly refining and finalizing theme names, continued until the last moments of writing this article (Trainor and Bundon 2021).

Reflexivity

As researchers implementing teaching and learning reform, we were interested in positively influencing CoP members' teaching practices. Joy's position as a SoTL graduate student conducting research with their graduate student peers, and Cari's position as a CoP leader, faculty member, and SoTL advocate facilitating teaching and learning reform and participating in weekly CoP meetings made us insiders in our study (Dwyer and Buckle 2009). Because of our insider status, we engaged in continuous reflexive practices to prevent over- or under-analyzing our data, while staying true to our aim of "illuminating the voices of research participants while acknowledging that [we], the researcher[s], [are] the narrator[s]" (Gair 2012, 140). We met weekly to discuss our work and intentionally engaged in reflexive dialogue, which helped us conduct and produce ethical research (Tracy 2010). We also practiced reflexivity throughout the project by keeping reflexive journals, tracking and auditing our thinking, assumptions, and feelings about the project (Berger 2015; Sparkes and Smith 2013). Discussing and writing about what we were noticing, wondering, assuming, and perhaps missing during weekly one-on-one check-ins supported our reflexive practice throughout this study (Berger 2015).

Because thematic analysis is interpretive work and themes are "actively created by the researcher at the intersection of data, analytic process, and subjectivity" (Braun and Clarke 2019, 594), we used our reflexive conversations and journaling to support self-appraisal and surfacing our personal experiences, biases, and assumptions potentially influencing our research process, not only during thematic analysis, but in conceptualizing and posing our research questions early in the research process (Berger 2015). Our thematic analysis is reflexive and embedded in the context we were immersed in as insiders, facilitating and learning in community with the GTAs at the centre of this study. Figure 1 depicts our research process, with each step informed by our reflexive conversations and journaling.

Figure 1. A visual representation of our research process



FINDINGS

In this section, we describe the six distinct themes we carefully developed and iterated from our reflexive thematic analysis of seven GTA interviews (Braun and Clarke 2019). The title for each theme is a response to our research question: What are the experiences of GTAs in a pedagogy-focused CoP? Direct quotations from the participants are used to depict, detail, and maintain fidelity to the voices of the seven GTAs who consented to participate in this study.

Feeling psychologically safe in weekly CoP meetings

Participants expressed feeling psychologically safe during CoP meetings, which they largely associated with the CoP leaders fostering a judgement-free environment where members could share teaching challenges and learn from each other. Psychological safety in a small group exists when members feel they will not be humiliated or punished for asking questions or speaking up (Edmondson 2019). Morgan described sometimes worrying about mistakes she made while teaching, yet feeling relieved and supported after talking about them in CoP meetings. For Emilie and Becca, hearing and relating to teaching challenges other GTAs described reassured them. Talking through teaching challenges during CoP meetings developed a sense of shared experience and support. Emilie said:

> Some labs I wasn't super excited about how it went, maybe it was a little flat and I couldn't get discussions going. But then, in the meetings, you find out other GTAs are having the same issue, and one of the CoP leaders would say "That's okay!", and that makes me feel more like "Okay, this is normal. Nobody's a perfect teacher." I don't have a ton of experience to be a perfect teacher anyway, right?

Feelings of psychological safety were strengthened through hearing the CoP leaders describe teaching challenges they were experiencing each week. Discovering faculty members who have been crafting their practice for years still struggle and continue to learn elevated participants' openness to continuous teaching improvement. Sebastian said:

> It's important to collaborate with peers, but also to not be afraid to ask faculty members about their experiences and how they overcome their teaching challenges. It was neat being able to learn from the CoP leaders and realizing that sometimes they still struggle with the same stuff we as GTAs struggle with.

Finally, psychological safety was strengthened through the pleasant, fun-loving tone of CoP meetings. Morgan stated, "we always had jokes and it felt really, really good to be able to look forward to a meeting like that. I don't think a lot of people can say they look forward to going to a GTA meeting!" Emma said, "I liked that we just laughed a lot sometimes." Participants said the warmth of meetings created a safe space for improving their teaching.

Acknowledging the positional power of the two CoP leaders

Despite being described by participants as psychologically safe, a CoP composed of graduate students and faculty members contains power relations and hierarchy. Sam expressed feeling pressured to speak up first during meetings because one of the CoP leaders was their graduate research supervisor:

> I felt like it was almost my responsibility, to a certain extent, especially with [CoP leader's name redacted] being my graduate supervisor, that I should be the one who is really trying to engage and contribute. Sometimes in our meetings, nobody would really want to start. For sure [my supervisor's] thinking "Say something!", and I'll be like, "Okay." If I was in their role and one of my students didn't say anything, I'd be like, "Come on! Say something! I'm dying here!"

In contrast, participants reflected in their interviews on how the CoP leaders' power and influence as advocates for the GTAs left positive impressions. More specifically, participants appreciated the CoP leaders praising their teaching efforts out loud. Emilie was heartened by hearing that the course instructor relayed stories of the GTAs' teaching successes at a formal faculty meeting.

Reflecting on their teaching practice each week was a novel experience

Being prompted to reflect on their teaching and sharing these reflections was completely new to the participants. Devoting at least half an hour each week to discussing what went well in their teaching and what challenges they would like support in solving was an experience no participant had before this CoP. Participants with previous GTA experience noted that weekly lab meetings in different courses focused on grading and logistics. For Emilie, talking about teaching every week was very different from their previous experience as a lab GTA for a different course:

> The weekly CoP meetings were different in a sense that we never talked about teaching in the meetings I was a part of in my first year being a lab GTA in a different course. I had the course instructor tell me "It's not your job to teach them. They learn everything in lecture. In the labs, they're just doing this stuff." So, it's just polar opposite, that instructor telling me not to teach like it's not my job and then we're talking about teaching every single meeting.

Reflecting on their teaching, however, did not always come easily to participants. Meetings started with each CoP member thinking about and sharing what went well in their teaching that week. Astrid and Sam found this quite challenging because talking about what they did well felt like boasting. Astrid stated:

> Sometimes reflecting in the weekly meetings was kind of hard, "I need to think about something now, say something good about my teaching this week," like, "What is it that I did well?" . . . I think it's really hard to do this kind of self-reflection and I don't think I'm alone in that. It's hard, especially when I have to find something good about my teaching. It feels like you're bragging, or it makes you a little bit uncomfortable. Like, what should I say? Was my teaching really that good?

Actively approaching teaching philosophies

Participants were introduced to teaching philosophies in the micro-course, and, for most of them, the concept of writing down one's teaching approach, values, and purpose was new. Learning about teaching philosophies helped participants see the intentionality behind good teaching. Astrid stated:

> The micro-course that we did before we started teaching, it was really useful and it kind of triggered me to think more about teaching theory, which I haven't done much so it's all really new to me. Even the teaching statement or teaching philosophy, it was new to me that you could write your own teaching philosophy that describes what you believe about teaching.

Participants said learning about teaching philosophies in the micro-course "started to get the wheels turning" (Becca) and focused their attention on their own pedagogical beliefs. Hearing about teaching philosophies prompted participants to seek out patterns in their teaching and start noticing what their students were learning and experiencing. Learning about the intentionality necessary for good teaching pushed participants to consider the process (how) and purpose (why) behind their teaching practices.

Discovering, discussing, and trying new teaching practices

Participants described incorporating teaching practices they learned from the micro-course and meetings, which were new to them as science students and teachers. For example, Emilie said asking open-ended questions was a new teaching strategy she tried and that it allowed her to respond to students in a way that promoted a psychologically safe discussion:

> We talked in the CoP about how it's a little difficult in ex-phys, but the importance of asking open-ended questions where maybe there's not a right or wrong answer, so maybe you're asking for a students' opinion on something. I tried the entire time to put that into practice. Another is psychological safety, trying to make sure that if students answer a question, they don't feel embarrassed if they get it wrong, and they feel like their opinion is valid.

Other practices participants mentioned were using feedback to connect with students as well as provide effective comments on their work, fostering student autonomy, and using strategies like stop-start-continue to gather formative feedback about their teaching from their students. Participants also discovered that effective lab teaching includes facilitating active student learning, which Sebastian describes as "guiding the topics and facilitating the questions students have, not necessarily by giving them answers but helping them form meaningful connections between materials." Sam stated a shift from seeing the purpose of their teaching as providing information to discovering their teaching could facilitate student learning, enjoyment, and interest:

> I felt like I was becoming more a facilitator than a teacher. Sometimes, maybe that's a good thing, rather than the classical model of teaching where you're delivering information and the students are absorbing it from you. Whereas being a facilitator can be beneficial by asking the

> right questions to students, using certain tactics to engage them, to make them excited, to have them think about reasons why they're doing something differently.

Week by week, participants filled their teaching toolbox with new strategies they discovered and discussed in the CoP. This process helped them become more confident and comfortable in their teaching and enabled them to become more autonomous teachers over time.

Becoming autonomous and confident teachers

With support from the CoP, participants described gradually developing confidence and autonomy in their teaching. They told us that as the semester progressed, the weekly meetings became a place where they were discussing new ideas and perspectives they might incorporate into their own teaching. Becca stated:

> One of the things I said in the weekly meetings was "I'm struggling with getting my students to speak up during the first pre-lab debrief," and it was nice to get some of my fellow GTAs' thoughts and suggestions and hear what the CoP leaders thought I could do and put all that together and judge what I thought would be best for my lab.

While GTAs were provided with a partially standardized slide deck for each lab, participants described integrating their interests and personality with their teaching over time. A few participants described developing confidence in themselves and their teaching by the end of the semester. Morgan mentioned feeling more equipped to teach well and Emma said she would be more spontaneous in her teaching if they were to teach the undergraduate ex-phys labs again. Emma said an important factor which enabled her autonomy and confidence was the trust and encouragement the CoP leaders offered:

> The course instructor trusted us a ton and that's good. That's autonomy on us as learners and teachers. It was kind of cool and like, "Wow, I can contribute! Nice!" . . . It probably helped with my confidence, as I got a feel for the course and stuff. I know the course instructor said, "We trust you. You have a lot of pull in this class. Their lab component is a huge component," and that basically, they had nothing to do with it. It's all on us GTAs and that's kind of intimidating . . . and I could see how someone could say what they said but then be in your face a lot throughout the semester being like, "Did you do this?" or micromanaging a little bit, and they did not do that at all. It was full trust from the very beginning, which is good. It was kind of stressful at the beginning, but a good amount of stress. You knew you were able to do it. It was just like a challenge you know you could take on. I think all of us GTAs did a great job.

DISCUSSION AND CONNECTIONS TO SOTL CONVERSATIONS

Our purpose in doing this study was to collect, describe, and develop our understanding of the experiences of GTAs participating in our CoP while teaching reformed undergraduate ex-phys labs. In this section, we make connections between our findings, existing research, and specific ongoing SoTL conversations.

Discovering, experiencing, and enabling psychological safety was central to the experiences of the seven GTAs who participated in our study. They described feeling a sense of community that

elevated trust and respect in a small group when psychological safety was present (Edmondson 2019). When a CoP is not psychologically safe, connection and feelings of belonging are weak, and members are not likely to share and accept knowledge (Nistor et al. 2015). Feeling psychologically safe facilitated GTAs' openness to reflection, discussion, and new teaching practices. The CoP leaders' actions were described repeatedly by GTAs as integral to feeling psychologically safe. Across organizational contexts (e.g., healthcare, business, education, sports) the leadership behaviours of emphasizing the group's purpose, posing good open-ended questions, intensely listening, and expressing appreciation for member contributions to the group's learning, enable psychological safety (Edmondson 2019). GTAs described many of these behaviours. Our findings suggest that establishing a feeling of psychological safety enabled the pedagogical practice and development GTAs described. We suggest a psychologically safe CoP can enhance the inclusive, authentic, and practical features of an effective CoP (Buysse, Sparkman, and Wesley 2003).

Beginning to sketch a personal teaching philosophy was a common experience among GTAs. Crafting a meaningful teaching philosophy requires identity work, which happens repeatedly in thriving CoPs (Wenger 1999). Identity work is the process of developing, revising, and modifying the stories of who we believe we are in a specific social context (Zheng, Meister, and Caza 2021). The consistent reflection GTAs did each week invited them to grapple with, make sense of, and integrate their learning with their cognitive structure (Moon 1999), and teaching identity. For GTAs, discovering evidence-informed teaching and learning practices that were new to them in the micro-course, followed by weekly reflection on their teaching, created space for considering their teaching beliefs, best practices, identity, and by extension, their teaching philosophy. Our findings indicate trust and encouragement from CoP leaders was instrumental in GTAs becoming autonomous and confident in their teaching. This leadership support paired with weekly teaching reflection and discussion contributed to the GTAs developing their teaching identity, autonomy, and confidence.

Sharing what went well in their teaching each week felt like boasting to a couple of GTAs in our study. When describing their own effectiveness in CoP meetings and in their interviews, GTAs who felt this way sometimes bracketed their stories with "I'm not trying to brag." It was easier for them to describe what did not go well or felt challenging in their teaching each week. This was an unexpected finding in our study. Through critical discussions and consulting our reflexive journals, we realized Cari's strengths-based approach (Oades et al. 2017) to teaching and learning was new to the GTAs. Using a strengths-based approach involves intentionally acknowledging and describing what is going well (Louis and Lopez 2014). We see a beautiful overlap between taking a strengths-based approach to developing future SoTL advocates and integrating recognition to build SoTL in the academy (Myatt et al. 2018). Our findings suggest small yet significant conversations (Roxå and Mårtensson 2009) about CoP members' teaching successes can initiate cultural change in a psychologically safe, pedagogy-focused CoP.

The CoP in our study was designed and facilitated to promote social learning, where interactions between CoP members are the site of potentially rich, agentic development and "learning is an integral and inseparable aspect of social practice" (Lave and Wenger 1991, 31). The experiences GTAs in our study described demonstrate their social learning within the CoP, starting with debriefing the micro-course together at the beginning of the semester. The micro-course created the first opportunity for learning together and created a foundation of principles and practices that surfaced in weekly CoP meetings. During GTAs' individual interviews at the end of the semester, particularly when

they recounted new concepts (e.g., teaching philosophies) and practices they learned and incorporated in their teaching (e.g., creating psychologically safe learning spaces) the micro-course was mentioned. Week-over-week, GTAs were developing a sense of shared experience and support, building a repertoire of teaching strategies together, and evolving as teachers. Social learning occurred for GTAs through "thinking together" in community and learning went beyond simply receiving information from experts. GTAs' learning involved social formation, changing their teaching identities, and making sense of their experiences (Pyrko, Dörfler, and Eden 2017). Our findings suggest creating social learning spaces (e.g., CoPs) where GTAs can develop their teaching practices and identities as they interact, learn, and collaborate with others in the academy is a promising practice.

LIMITATIONS AND FUTURE CONSIDERATIONS

Limitations are inherent to any study and our most clear limitation is that three of the 10 possible participants in our study did not elect to do an interview. This lack of contribution limited our understanding of all GTA experiences in the semester-long, pedagogy-focused CoP at the centre of this study.

A second limitation is that the deeply contextualized, local, and specific nature of our study featuring the detailed and nuanced experiences of seven GTAs may not transfer directly to different contexts in the academy. However, we believe valuing GTAs' pedagogical development and creating learning communities to support their evidence-informed teaching is important to consider across higher education contexts where graduate students are teaching undergraduates.

There are many opportunities for designing excellent SoTL research which builds on what we have discovered in this study. Future studies could test and extend our findings from one faculty where GTAs were all teaching the same labs each week, into different contexts; other researchers could design, facilitate, and study CoPs that consist of GTAs with different roles and disciplines in the academy (e.g., multidisciplinary faculty learning communities as described by Cox and McDonald [2017]).

Finally, it would be interesting to see if asking GTAs to write their personal teaching philosophy sometime during the semester in a similar project contributes to the development of their teaching identity and evidence-informed practices. Further, supporting GTAs in developing first drafts of their teaching dossiers could support their development as teachers and leaders in teaching and learning.

OUR RECOMMENDATIONS FOR SIMILAR WORK IN DIFFERENT CONTEXTS

Go first and model what you seek

In collaborative communities where students, faculty members, and staff strive to learn together, hierarchy is inevitable. Despite the call for CoPs without hierarchy (Donaldson 2020), the CoP leaders in our study were faculty members and graduate supervisors, which gave them undeniable positional power in the CoP. Followership is not typically investigated nor encouraged in CoPs; however, we know learning from leaders, mentors, and supervisors—folks with power—is embedded across our learning and identity development in the academy (Billot et al. 2013). Without the CoP leaders showing up every week, actively participating, and openly discussing their own teaching challenges, a vital aspect of the CoP would have been missing, according to the GTAs in our study. By going first, both CoP leaders made their pedagogical challenges and victories transparent every week. These leaders modeled continuously embracing challenges and opportunities to develop their teaching and to enrich their students' learning.

A blueprint for an effective pedagogy-focused CoP

We recommend the small yet impactful act of (regularly—we cannot stress this enough) carving out time to reflect out loud and in community on what is working in our teaching and what challenges we would like support in navigating. Like Donaldson (2020), we suggest providing a common entry point for CoP members, which in our study was the asynchronous, pedagogy-focused micro-course. We recommend developing and debriefing asynchronous, small batch learning which creates a starting point and shared language for CoP conversations about teaching and learning. We wholeheartedly endorse maintaining a sharp and evolving focus on issues as they arise, collaborative problem solving, and nurturing personal relationships (Donaldson 2020) in future pedagogy-focused CoPs aimed at enriching GTAs' pedagogical knowledge, practice, and confidence.

Put your money where your SoTL is

GTAs are typically allocated a specific number of paid hours in their contracts, most of which are spent on lab duties and grading (Deacon, Hajek, and Schulz 2017). This traditional allocation of resources means any time spent developing their pedagogy is unpaid. We believe this practice should be overturned. Hours GTAs in our study spent learning about, practicing, and collectively improving their teaching (~10–12 hours) positively impacted their pedagogical growth. We recommend valuing this aspect of graduate student development in the same way we value research contributions in the academy—through paying for it.

Laugh when you are together

We finish with smiles on our faces and a recommendation for fun. Everyone in our CoP appreciated moments of laughter during meetings. One memorable anecdote we have is from a CoP meeting where one GTA asked what a think-pair-share (Prahl 2017) learning activity involved. The scene was set to role play this type of learning activity and instead of featuring a discipline-based question, another GTA said think-pair-share could be done by asking students: What's your favourite food? The two CoP leaders role played their responses (and described in surprising detail their favourite foods), and CoP members laughed while learning a very effective teaching technique. Rich learning does not always require a serious atmosphere, and we feel it is important to bring lightness to CoP gatherings, when possible, without diminishing the scholarly practices at the centre of learning.

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AUTHOR BIOGRAPHIES

Joy Camarao, MSc, was a graduate student in the Faculty of Kinesiology at the University of Calgary.

Cari Din, PhD, is an associate professor (teaching) in the Faculty of Kinesiology at the University of Calgary.

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